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BURTON E. LIVINGSTON, Editor-in-Chief
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Vol. VI NOVEMBER, 1920 No. 2

ENTRIES 474-878

AGRONOMY

C. V. PIPER, *Editor*
MARY R. BURR, *Assistant Editor*

474. ANONYMOUS. **Betaenkning fra det Kgl. Danske Landhusholdningssilskab. [Thoughts from the Royal Danish Agricultural Society.]** Tidsskr. Landokonomi (Kjöbenhavn) **1920**[2]: 49–80. 1920.—This discussion deals in part with irrigation problems in Denmark, where irrigation has rarely been attempted. A few farmers have recently constructed tanks into which water is pumped for use in irrigating small areas. Thus far these attempts are merely experimental.—*Albert A. Hansen.*

475. BEATH, O. A. **Poisonous plants.** Proc. Soc. Promotion Agric. Sci. **39**: 39–47. 1919. —Poisonous plants are responsible for the loss of considerable numbers of live stock. In Wyoming the loss of sheep from this cause is estimated at 14 per cent. The principal poisonous plants may be placed in two groups: those that occur rather generally distributed and in large numbers in several states, as the locos (*Oxytropis* and *Astragalus*), larkspurs (*Delphinium*), death-camus (*Zigadenus*), water hemlock (*Cicuta*), vetches (*Astragalus*), lupines (*Lupinus*), and aconites (*Aconitum*). In the other group are those that occur only in restricted areas and often only as single plants, as laurels, ferns, milkweeds (*Asclepias verticillata*), Woody aster (*Xylorrhiza parryi*), western sneeze weed (*Dugaldia hoopesii*), wild cherry and oaks. The author suggests as methods of control: (1) education of stockmen to recognize poisonous plants, (2) a complete poisonous plant survey for each western state, (3) discontinuance of practice of trailing sheep long distances to bedding pens, (4) ample supplies of salt for the stock, (5) the commercial exploitation of poisonous plants for medicinal purposes, thus reducing their number.—*H. N. Vinall.*

476. COCKAYNE, L. **The importance of plant ecology with regard to agriculture.** New Zealand Jour. Sci. Tech. **1**: 70–74. 1918.

477. DUDDLESTON, B. H. **The modified rag doll and germinator box.** Purdue Univ. Agric. Exp. Sta. Bull. 236. *12 p. 7 fig.* 1920.—The modified rag doll for testing seed corn recommended in this bulletin is very simple in construction. It consists of a sheet of cloth of suitable size placed upon a sheet of heavy paper slightly longer. The heavy paper serves as an insulator to prevent molds from permeating the cloth and thereby rotting many of the seedlings. The seeds from each ear are separated and when they carry rot-producing organisms they can be easily noted and the seed ears represented by them can be discarded. The

germinator box serves to keep the dolls in proper position and thoroughly moist. This method of testing seed corn is well suited for community testing. Results of a test on a large scale at Shelbyville, Indiana, in 1920 show an average of 35 per cent of infected seed ears.—*G. N. Hoffer.*

478. Espino, Rafael B. **A review of the maize investigations at the College of Agriculture.** Philippine Agric. 8: 191–197. 1919.—An epitome of the maize investigation completed by the Philippine College of Agriculture and a bibliography of the same.—*C. V. Piper.*

479. Fisher M. L. **More study of pastures and pasturing needed.** Proc. Soc. Promotion Agric. Sci. 39: 19–21. 1919.—"Inasmuch as pasturage is so important in live stock farming it is rather strange that so little has been done in an experimental way with pastures and pasturing." To remedy this situation, experiments covering the adaptation of plants to soils, seed bed preparation, single or mixed seedlings, fertilization, carrying capacity of pastures, continuous or alternate grazing, improvement of grass seeds and breeding of better plants are suggested.—*Lyman Carrier.*

480. Harris, J. Arthur. **Practical universality of field heterogeneity as a factor influencing plot yields.** Jour. Agric. Res. 19: 279–314. 1920.—Heterogeneity is the difference in capacity for crop production, throughout a field of such magnitude as to influence in like manner, but not necessarily in like degree, the yield of adjacent small plots. Experimental data from many published sources are analyzed statistically to determine the extent to which heterogeneity of experimental fields may influence plot yields. The results of the analysis show that in every field the irregularities of the substratum have been sufficient to influence, often profoundly, the experimental results.—Analysis of data on physical and chemical requisites for plant growth show that the coefficients for water content and for chemical composition of soil are of about the same order as those found for crop yields and "while these results do not prove that the heterogeneity of experimental fields in their capacity for crop production is directly due to these and other physical and chemical factors, there can be little doubt that this is actually the case." Greater care in technic and more extensive use of the statistical method in analysis of plot experimentation are recommended.—*D. Reddick.*

481. Hertel, H. **Landbruget i 1919. [Agriculture in 1919.]** Tidsskr. Landokonomi (Kjöbenhavn) 1920[1]: 1–36. 1920.—During the month of May, 1919, various species of insects attacked the small grains. Sandfleas were particularly bad on barley, but since the infestation did not last long the damage was not severe. The green fly larvae did considerable damage to oats in late sown fields. Grain lice attacked barley and oats, but rain and cool weather seemed to stop damage from this source. During the year 1919 the fields seemed unusually free of weeds. During August and September cabbage worms and cabbage lice caused considerable damage to cabbages and turnips.—*Albert A. Hansen.*

482. Hoffer, G. N. **Disease-free sweet corn seed.** Purdue Univ. Agric. Exp. Sta. Bull. 233. *12 p., fig. 1–8.* 1920.—See Bot. Absts. 6, Entry 1271.

483. Maiden, J. H. **Chats about the prickly pear. No. 4.** Agric. Gaz. New South Wales 31: 407–412. 1920.—Presents a résumé of results in the feeding of *Opuntia* spp. in Australia, in the United States and in India.—*L. R. Waldron.*

484. McGovern, J. A. **Wheat grading for schools.** North Dakota Agric. Exp. Sta. Ext. Div. Circ. 36. *8 p. 5 fig.* 1920.—An illustrated description of wheat grading for instruction in the public schools, as required by the state law.—*C. V. Piper.*

485. McKenzie, R. T. **Agriculture in Denmark.** Jour. Dept. Agric. Victoria 18: 140–149. 1920.—General conditions described.—*J. J. Skinner.*

486. Mendiola, Nemesio B. **A review of the rice investigations at the College of Agriculture.** Philippine Agric. 8: 145–160. 1919.—A résumé and bibliography of the rice investigations by the Philippine College of Agriculture.—*C. V. Piper.*

487. Osborn, Herbert. **The problem of permanent pasture, with special reference to the biological factors.** Proc. Soc. Promotion Agric. Sci. 39: 7–18. 1919.—Emphasis is placed on the importance of pastures and statistics are given showing the comparative areas of pastures and meadows. Attention is also directed to the extremely meager experimental data on pasture management and the desirability of comprehensive experiments to guide the stockman in the proper utilization of his grazing lands. The complex nature of the pasture problem involving the various branches of biological science leads the writer to suggest that it "merits the attention of some broad organization and that it should be so organized as to secure the cooperation of technically trained men in the various scientific branches concerned." Such an organization it is stated "would certainly secure more important results and in much less time and with far less expense than can ever be hoped for in disjointed and fragmentary studies in different phases of the problem, even if taken up by many different workers and in many different states."—*Lyman Carrier.*

488. Roxas, Manuel L. **Sugar cane investigations at the College of Agriculture.** Philippine Agric. 8: 179–189. 1919.—A digest of sugar cane studies at the Philippine College of Agriculture, together with a bibliography.—*C. V. Piper.*

489. Ruffer, Sir Arnold. **Food in Egypte.** Mem. Inst. Egypte 1. *86 p.* 1919.

490. Temple, A. J. **Canadian wonder beans.** Jour. Dept. Agric. Victoria 18: 175–177. 1920.—Conditions suitable for growing beans in Victoria are described and cultural methods given.—*J. J. Skinner.*

491. Waldron, L. R. **Annual hay and forage crops.** North Dakota Agric. Exp. Sta. Ext. Div. Circ. 37. *8 p., 1 fig.* 1920.—Discusses briefly culture and utilization of foxtail millets, proso (*Panicum miliaceum*), Sudan grass, maize, oats, barley, field peas, sunflowers, Russian thistle, rape, sweet clover, rye and sorghums.—*C. V. Piper.*

492. Wenholz, H. **The utilization of reclaimed swamp land.** Agric. Gaz. New South Wales 31: 401–405. 1920.—Deals in part with suitable pasture plants and with crops and fertilizers.—*L. R. Waldron.*

493. Wiancko, A. T., and C. O. Cromer. **Soybeans in Indiana.** Purdue Univ. Agric. Exp. Sta. Bull. 238. *16 p., 8 fig.* 1920.—Because of their high feeding quality and beneficial effect on succeeding crops, the growing of soybeans is highly recommended to Indiana farmers. Soybeans may be used as a substitute for clover, in case of failure of this crop. As a regular rotation crop soybeans should follow corn. Where wheat followed soybeans, yields were increased 6½ bushels per acre. Directions are given for soil preparation, fertilization, seed inoculation, cultivation, harvesting and threshing. Results of tests on method and rate of planting and on variety yields are presented.—*Max W. Gardner.*

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*

Alfred Gundersen, *Assistant Editor*

494. A., J. C. [Rev. of: Cockayne, L. **New Zealand plants and their story.** New Zealand Board of Science and Art, Manual No. 1. *xvi + 248 p.* Wellington, New Zealand, 1919.] New Zealand Jour. Sci. Tech. 2: 407-409. 1919.

495. Anonymous. **The New Zealand Institute Science Congress, Christ Church, 1919.** New Zealand Jour. Sci. Tech. 2: 226–230. 1919.

496. Briquet, J. **Rapport sur l'activité au Conservatoire et au Jardin Botanique de Genève pendant les années 1916, 1917, et 1918.** [**Report on the Conservatory and Botanical Garden of Geneva for 1916, 1917 and 1918.**] Ann. Conservatoire et Jard. Bot. Genève 20: 479–509. 1919. —The report gives a classified account of the collections received at the Delessert Herbarium and a list of the publications based on the collections at the Herbarium. There are also notes on the "Iconothèque" or collection of portraits, the botanical museum, and the botanical garden.—*A. S. Hitchcock.*

497. Brown, J. G. **A new text book of botany.** [Rev. of: Martin, J. N. **Botany for agricultural students.** John Wiley and Sons: New York, 1919.] Plant World 22: 217. 1919.

498. C., C. A. [Rev. of: anonymous. **Plan of Tongariro National Park, [2 miles = 1 in.**.. Lands and Survey Dept., Wellington, New Zealand, 1917.] New Zealand Jour. Sci. Tech. 1 191. May, 1918.

499. Checkley, George. **The formation of a students' botanical garden.** Pharm. Jour **104:** 44. 1920.—See Bot. Absts. 6, Entry 1298.

500. Densmore, Hiram D. **General botany for universities and colleges.** *xii + 459 p.. 289 fig.* Ginn & Co.: Boston, 1920.—Part I, Biology of the higher seed plants, contains eleven chapters, arranged in four sections as follows: (1) Plants and the environment, (2) Cell structure and anatomy, (3) Physiology, (4) Reproduction. Chapters X and XI are entitled "Plant breeding and evolution," and "Historical development of botany and the biological sciences." Part II comprises six chapters on the great groups of plants, and Part III five chapters on "Representative families and species of the spring flora."—*C. S. Gager.*

501. Forbes, R. D. **Specialization vs. generalization in forestry education.** Jour. Forestry 18: 383–390. 1920.—Training in forestry has gone too far in specialization, the great need being for men with training along broad lines. Economics, public speaking, psychology and other cultural courses are recommended.—*E. N. Munns.*

502. Gager, C. Stuart. **Ninth annual report of the Brooklyn Botanic Garden, 1919.** Brooklyn Bot. Gard. Record 9: 29–89. Apr., 1920.—Contains also the annual reports of the heads of departments of the Garden.

503. Grier, N. M. **The range of information in biology. III Botany.** Jour. Educat. Psychol. 10: 509–16. 1919.—Nature study tends to include more botany. A hundred words relating to plants were given to high school pupils, who were asked to define or explain them, or state if familiar or new. It appears that botany has better basis on which to build than physiology or zoology, and should not be excluded from curriculum.—*A. Gundersen.*

504. Michael, Ellis L. **Marine ecology and the coefficient of association. A plea in behalf of quantitative biology.** Jour. Ecol. 8: 54–59. 1920.

505. Petrie, D. **The need of a comprehensive Dominion herbarium.** New Zealand Jour. Sci. Tech. 2: 260–262. July, 1919.—Recommends that the Dominion government "should without delay set about creating a comprehensive Domionon Herbarium, and appoint for its management an expert director of Plant Research . . . . A good garden, not so much for the display of floral richness as for practical economic purposes, will be an indispensable appendage to any worthy herbarium today." Besides the more conmmonly recognized functions of a national herbarium, author adds, "inquiries into the uses and the diseases of plants of economic importance, and the investigation of other questions of biological significance." Urges also the founding of a comprehensive plant museum for the Dominion.—*C. S. Gager.*

506. Thomson, J. A. **Proposals for a Dominion scheme of libraries of science and technology.** New Zealand Jour. Sci. Tech. 2: 353–365. 1919.

507. T[homson], J. A. [Rev. of: Fleming, A. P. M. **Industrial research in the United States of America. No. 1.** *60 p., 85 pl.* London, 1917.] New Zealand Jour. Sci. Tech. 1: 122–124. March, 1918.

508. T[homson], J. A. [Rev. of: Hogben, G., and J. A. Thomson. **Report on the organization of scientific and industrial research.** New Zealand Parl. Paper H, 47. *9 p.* 1917.] New Zealand Jour. Sci. Tech. 1: 120–122. March, 1918.

509. W., L. J. [Rev. of: **Agricultural research in Australia.** Commonwealth of Australia Advisory Council of Science and Industry. Bull. 7. Melbourne, 1918.] New Zealand Jour. Sci. Tech. 2: 155–157. March, 1919.—Official report of the proceedings at a conference of agricultural scientists held in Melbourne in November, 1918, under auspices of Advisory Council.

510. Wells, Morris M. **The relation of ecology to high school biology.** School Sci. Math. 18: 439–446. May, 1918.—See Bot. Absts. 4, Entry 384.

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*
J. V. Hofmann, *Assistant Editor*

511. Anonymous. **Der Haushalt der preussischen Forst- und Landwirtschaftlichen Verwaltung für das Rechnungsjahr 1919.** [Financial statement of the Prussian Department of Forests and Agriculture, fiscal year 1919.] Forstwiss. Centralbl. 41: 327–332. 1919.—Total income of the forest administration was 263,301,000 marks, or 68,440,000 marks more than in 1918. 240,000,000 marks was received for timber, an increase of 65,000,000 over 1918, due to increased quantities sold. Other income was from by-products (resin, etc.), 15,000,000, hunting, 1,250,000, and miscellaneous 7,051,000 marks. Total expenses were 87,916,000 marks, or 11,085,000 more than in 1918. These included salaries, 17,816,400 marks, costs of cutting and transporting timber, 35,000,000 marks, and various other costs of administration, improvements, pensions, and the like. The total area of State forests was 3,052,092 hectares, 13 hectares more than in 1918. Of this, 2,728,868 hectares are productive forest. Total yield of wood is estimated at 11,351,749 cubic meters. The personnel numbers 6509, including 744 Oberförster ("Supervisors") in charge of forests and 3965 Revierförster and Förster ("Rangers") in charge of districts.—*W. N. Sparhawk.*

512. Anonymous. **Die Brautigamspflanzung auf Alsen.** [The bridegrooms' plantation on Alsen.] Des Försters Feierabende [Supplement to Deutsch. Forstzeitg. 35] no. 35. 1920.—An old custom required every man on Alsen Island, before his marriage, to plant ten young oaks or fifteen beeches, or pay a fine. Hence the name for the oak and beech woods.—*W. N. Sparhawk.*

513. Anonymous. **Die Forderung des Anbaus von Korbweiden.** [Encouraging the production of basket willows.] Deutsch. Forstzeitg. 35: 175. 1920.—With the shortage of foreign raw material the basket industry is in sore straits. The chief sufferers are the war-injured and other economic weaklings. It is necessary to utilize all existing willow holts and to develop new ones in every suitable place.—*W. N. Sparhawk.*

514. Anonymous. **Die neue Dienstanweisung für die preussischen Staatsförster.** [New service instructions for Prussian state foresters.] Forstwiss. Centralbl. 41: 464–473. 1919.—Gives in detail the duties of local forest field officers, effective October 1, 1919.—*W. N. Sparhawk.*

515. Anonymous. **Eine Verordnung über die Einschränkung der Kahlschlage in den nich staatlichen Waldungen. [Ordinance concerning restriction of clearing in forest not belongin to the state.]** Deutsch. Forstzeitg. 35: 193–194. 1920.—Before the war Germany was heavy importer of wood, but now most imports have been cut off, due to the worldwide short age of wood and to the high prices and unfavorable rate of exchange. Moreover, large area of forests have been lost to Germany as a result of the war. The scarcity of fuel has resulte in enormous demand for firewood, which further reduces the production of building materia in German forests. The same conditions that hinder imports favor exporting of wood, an a considerable illicit trade is carried on across the border. The net result of these factors is tendency to destroy large areas of private forests for immediate profit. The central governmen has proposed a decree forbidding clear cutting, or cutting which leaves less than one-fourt of the normal stand, on any area of more than 0.5 hectare in other than state forests, excep with permit from designated authorities. Such permission may be withheld in case the pro posed cutting endangers the given stand or neighboring ones, through formation of torrents shifting sands, or exposure to wind, or if the stand to be cut is at a period in its growth when considerable loss in volume production would result from it cutting, or if a continuous sup ply of wood for the local population and industries would be threatened, or if reforestatio would be made difficult. A sufficient sum to carry out reforestation measures must be depos ited with proper authorities. Penalties for violation are set at from 1000 to 10,000 mark per hectare, unless local laws prescribe higher ones.—*W. N. Sparhawk.*

516. Anonymous. **Ergänzende Anweisung zur "Anweisung zur Ausführung der Betriebs regelungen in den Preussischen Staatsforsten vom 17 März, 1912," bis 12 März, 1919. [Supple mentary instructions for management of Prussian state forests.]** Forstwiss. Centralbl. 41 310–317. 1919.—Due to heavy cutting in the state forests, and especially in young stands during the war, certain changes in management are necessary. Most important is to shorten the rotation period. An average rotation of 100 years is set for pine and, in general, also for spruce. Since it will be necessary to produce high grade large timber, common timber and mine timber and pulpwood, the stands will be managed on three different rotations depending on the particular stands in each case, of 120 years, 100 years, and 60 years, in about the proportion 2:3:1 (making the average 100). For hardwoods the former rotations will generally be used. In case of the younger stands, decision as to the rotation to be used can be deferred until they are older. As a basis for planning the regulation, an age-class survey and map must be made. For this purpose the forests are to be classified in four main types according to the predominating species: oak; beech-ash-maple; birch-alder; and fir-spruce-pine. Other instructions relate to changes in the working plan and cutting budget.—*W. N. Sparhawk.*

517. Anonymous. **Gegen die Zwangsbewirtschaftung des Eichengerbholzes. [Against compulsory utilization of oak tanning-extract wood.]** Deutsch. Forstzeitg. 35: 194. 1920.—The wood committee of the imperial forestry council has decided against compulsory utilization of oak extract-wood and tanbark, but urges all forest owners to keep in mind the need of the German leather industry for such material.—*W. N. Sparhawk.*

518. Anonymous. **Milderung der Brennholznot im nächsten Winter. [Relief of fuel shortage for next winter.]** Deutsch. Forstzeitg. 35: 194. 1920.—Fuel shortage will probably be as acute next winter as in the one just past, especially since much wood as would ordinarily be available for fuel will be taken for mine timbers, paper pulp, and ties. Coal production must be increased and stumps and peat must be utilized as far as possible.—*W. N. Sparhawk.*

519. Anonymous. **Neuregelung der Jagdnutzung in den preussischen Staatsforsten. [New regulations governing hunting in Prussian state forests.]** Forstwiss. Centralbl. 41: 449–464. 1919.—Gives in considerable detail the new regulations effective October 1, 1919. The policy has been adopted of keeping the hunt under control of the forest administration, except in exceptional cases where it may be leased.—*W. N. Sparhawk.*

520. Anonymous. **Note on sal sowings in the western Dooars.** Indian Forester 46: 297–303. *1 fig.* 1920.—Results of experimental seed sowing of sal in India show that the work must be done in the open and that the competition of the native grasses must be kept down. Planting with *Tephrosia* is advocated as a measure of insuring slight competition, green manuring and protection. Grass fires set the plantations back about three years and animals do considerable damage.—*E. N. Munns.*

521. Anonymous. [Rev. of: Hargreaves, W. A. **An investigation into the prospects of establishing a paper making industry in South Australia.** Dept. Chem. South Australia Bull. 1. *56 p.* Adelaide 1916.] New Zealand Jour. Sci. Tech. 1: 60. 1918.—Australia is said to be the largest consumer of paper in the world, per capita of population, and South Australia is entirely dependent upon outside sources for supplies of both paper and millboard. There are four mills in Victoria. Besides the manufacture of paper from straw, the article also deals fully with the manufacture of straw boards, and in both cases the estimated costs of manufacture are detailed in full.—*C. S. Gager.*

522. Anonymous. [Rev. of: Pool, Raymond J. **Handbook of Nebraska trees.** Nebraska Conserv. and Soil Surv. Bull. 7. Lincoln, Nebraska, 1919.] Jour. Forestry 18: 424–426. 1920.

523. Anonymous. **Waldverwüstung in der Umgebung von Wien. [Forest devastation around Vienna.]** Deutsch. Forstzeitg. 35: 42. 1920.—Although cutting of marked trees is permitted on a strip 3 kilometers deep and 50 kilometers long in the Wienerwald, no one takes the trouble to locate the marks, and all the trees are being cut. Trees planted along the banks of the Danube to prevent flood and washing have also been cut. The famous Waldgürtel (forest belt) has almost been entirely destroyed. Many people make a regular business of stealing wood and selling it; school-boys make 100 kroner a day, and many coachmen have become very wealthy. In the Hütteldorf forest there are, on the average, 10,000 woodthieves at work on weekdays and 100,000 on Sundays.—*W. N. Sparhawk.*

524. Anonymous. **Washington's sick sycamores.** Amer. Forestry 26: 267. *1 fig.* 1920. —Concerns treatment of sycamores for the sycamore louse and oyster-shell scale.—*Chas. H. Otis.*

525. Archibald, Jno. C. **Points to remember.** Quart. Jour. Forest. 13: 165–185. 1919. —Twenty points which the author believes are especially important for forestry students to memorize are listed. They deal with a variety of subjects from silviculture to personal manners. These "points" are followed by a short discussion of nursery practice, planting, thinning, pruning, ditching, fencing, hedging, and walling. The silvical characteristics of a few common forest trees are also taken up briefly.—*C. R. Tillotson.*

526. Augur. **Aus dem deutschen Forstjahr 1919. [Developments in German forestry in 1919.]** Deutsch Forstzeitg. 35: 185–188. 1920.—Notes various developments affecting the personnel, as a result of the loss of large forest areas by the treaty of peace and as a result of the Revolution.—*W. N. Sparhawk.*

527. B., C. U. **The importance of vertical stacking in the seasoning of converted material.** Indian Forester 46: 238–239. *1 pl.* 1920.—In the manufacture of boxes for special purposes, water seasoning in the log form is necessary. After cutting, the material should be stacked on end for 15 days and then piled horizontally for 3–6 months, to secure the best material. The difference in red and white *Bombax* is due to a difference in the grain of the wood.—*E. N. Munns.*

528. Bailey, W. A. **Length of time taken by sal seedlings to establish themselves.** Indian Forester 46: 307–309. 1920.—Fenced and cultivated plots show a much more fully stocked stand of sal seedlings than plots not so cared for. So far, it has taken ten years for natural-sown seedlings to develop into a full crop of fully established young plants. [See also next following Entry, 529.]—*E. N. Munns.*

529. Bailey, W. A. **Season of growth of sal, Shorea robusta.** Indian Forester 46: 317 1920.—Measurement of sal sample plots showed a growth of but 0.2 inch in circumference in the June-to-January period, while a normal increment for a full year is 1.0 inch. It may b that maximum growth takes place before the monsoon. [See also next preceding Entry, 528.] —*E. N. Munns.*

530. Baltz. **Die Weymouthskiefer (Pinus strobus.)** [**The Weymouth pine.**] Forstwiss Centralbl. 41: 302–307. 1919.—Suggests caution in planting white pine on a large scale in Germany, because it is susceptible to blister rust (*Peridermium strobi*), it has a decided tendency to develop many branches which hang on even after they die, and so yields inferior lumber; and it is attacked by the pine bark-louse (*Chermes strobi*), which retards growth and even kills the trees or so weakens them that they are attacked by the fungus *Agaricus melleus*. Neither does this tree, as has been supposed by some, thrive on all kinds of sites but requires a fair amount of moisture and prefers good soil, upon which native species will generally yield better returns. Some of the failures of white pine plantations are due to carelessness in selecting the sites. The wood is not of particularly high quality; even attempts of the Diamond Match Company in Germany to use it for match manufacture failed, because it did not split well and was too brittle. Planting in pure stands is not recommended, but on account of its good silvical qualities it is a good species to plant in mixed stands with spruce, beech, and Scotch pine, especially to fill openings which may develop in such stands after they are established. The name "silk fir" (*Seidenföhre*) has been used in Baden and the Palatinate to avoid the English "Weymouth pine." "White pine" conflicts with *Pinus silvestris*, called white pine in Austria to distinguish it from the black pine. Baltz suggests "Strobe."—*W. N. Sparhawk.*

531. Bandekow. **Die Anwendung der Photogrammetrie in der Forsteinrichtung.** [**Use of photographic surveying in forest management.**] Deutsch. Forstzeitg. 35: 60–61. 1920.—Suggests that aerial photography will be very useful in mapping forest areas.—*W. N. Sparhawk.*

532. Beevor, Sir Hugh R. **Young woods in Belgium.** Quart. Jour. Forest. 13: 272–275. 1919.—This is a brief discussion of the methods followed and the species used in recent forest planting operations in Belgium.—*C. R. Tillotson.*

533. Brown, William H., and Elmer D. Merrill. **Philippine palms and palm products.** Forestry Bur. Philippine Islands Bull. 18. *129 p., 44 pl.* 1919.—A general consideration of the economic uses of all known Philippine palms, comprising 123 species in 24 genera. Keys are given to the genera and species and brief descriptive notes, all local names, distribution, and occurrence are noted for each species. The group is one of very great economic importance, yielding a multitude of materials entering the internal and external commerce of the Philippines.—*E. D. Merrill.*

534. Bruce, Donald. **The height and diameter basis for volume tables.** Jour. Forestry 18: 549–557. 1920.—Volume tables are based upon diameter and height, the measurement of the former "breast high" being generally accepted. While more variable than diameters taken at some other heights, it is precise enough for forest practice. In height measurements, there is little conformity. Total height is correct for sample plot work and cubic foot volume tables. For general practice, total height is not always possible and there is a wide divergence between the fixed top diameter and the merchantable height. In the latter case, the divergence varies with the intensity of the utilization and the practice of the region. With tables prepared to a fixed top, a corrective factor may be applied in accordance with the practice of the logger and region. The use of form factors only serves to complicate the matter.—*E. N. Munns.*

535. Bruce, Donald. **A proposed standardization of the checking of volume tables.** Jour. Forestry 18: 544–548. *1 fig.* 1920.—Volume tables need better and more uniform check-

ing. By lax methods checks are made which do not show the true state of affairs. Of three methods possible, that of the average deviation appears to offer the greatest possibilities. Two tests should be made of every volume table, a comparison of the true volume against the table volume, and a computation of the average deviation of the individual volumes from it. With these tests prepared for each table it should be possible to determine the accuracy of the table for use in any region or for any set of trees by the degree to which they fit.—*E. N. Munns.*

536. Bryant, H. B. A suggested general forest organization for the Madras Presidency. Indian Forester 46: 205–212. *1 fig.* 1920.—It is proposed to organize the work under the four branches: Working Plans, Exploitation, Clerical and Educational. The functions of each branch and its organization are depicted.—*E. N. Munns.*

537. Cape, John. **The measurement of timber.** Trans. Roy. Scot. Arbor. Soc. 33: 127–138. 1919.—The author points out the inaccuracy of the "quarter girth system" of measuring timber, which has become so universally used in the British Isles, discusses other systems of measurement and finally proposes for use the formula 1/2 (D^2) L. The amount of manufactured material produced from a log is taken as equal to a square log, having as its section an area equal to the square inscribed in the mean sectional area of the log.—*C. R. Tillotson.*

538. Carhart, A. H. **Recreation in the forests.** Amer. Forestry 26: 268–272. *10 fig.* 1920.

539. Cary, Austin. **Reflections.** Jour. Forestry 18: 472–476. 1920.—The professional forester has laid himself open to criticism because he has not purchased and put into operation on his own lands what he has been preaching as good for the lumberman.—*E. N. Munns.*

540. Claughton-Wallin, H., and F. McVicker. **The Jonson "absolute form quotient" as an expression of taper.** Jour. Forestry 18: 346 357. 1920.—Investigations to determine the extent to which the Jonson "absolute form quotient" agrees with American timber shows that it is of great value in reducing the number of field measurements necessary to prepare an ordinary volume table. Tried out on small eastern pines and spruce the results were surprisingly good and even in the large timber of the American northwest, the theory is of great value. For large timbers the root swelling interfered to a considerable extent, but below 12 inches breast high root swelling is a negligible factor. Form class is hard to determine, but density appears to be an excellent criterion of the average form of trees in even-aged stands, and a relation between density and form class can be established.—*E. N. Munns.*

541. Dallimore, W. **Elms and elm timber.** Quart. Jour. Forest. 14: 109–118. 1920.—This article discusses the difficulties attending the sale of elm timber by owners in the British Isles, attributes it to the failure of both grower and timber merchant to recognize and keep separate the several different kinds of elm. Discusses the characteristics of the elms of Britain.—*C. R. Tillotson.*

542. Deb, Sasi Mohan. **Tea box industry in Upper Assam.** Indian Forester 46: 304–307. 1920.—A list of the woods in order of their value for tea boxes is given and their method of manufacture is described.—*E. N. Munns.*

543. Eberhard. **Was will der Abrücksaumschlag (Keilsaumbetrieb)?** [**Wedge strip cuttings.**] Forstwiss. Centralbl. 41: 441–448. 1919.—With most silvicultural systems that depend upon natural reproduction, considerable damage is done to young growth by the removal of the older trees. This is particularly true where, as in most cases, successive cuttings proceed *away* from roads and *upward* on slopes. Under the system here proposed cutting begins half way between main roads, in level country, and proceeds *toward* the roads, so that logs are not dragged over young growth. On slopes, cutting strips lie up and down the slope. The system involves a preparatory stage, with frequent light thinnings in the upper crown

class over the whole area until reproduction is established and two or three years old. This preliminary stage is practically the same in all methods relying on natural reproduction. The method described differs from the strip selection system (Blendersaumschlag) in that the resulting new stand in each compartment is even-aged or at most divided into a few even-aged groups. It differs from the shelterwood system in that the removal of the old stand is not carried on uniformly over the whole area but is done unevenly in strips or wedge-shaped patches. It is claimed that damage both from windfall and from logging is very small, while logging costs are kept down to a minimum.—*W. N. Sparhawk.*

544. Eckstein. **Wieder die Buchen-Wollschildlaus, Cryptococcus fagi. [The beech wooly-scale-louse.]** Deutsch. Forstzeitg. 35: 194-195. 1920.—Notes on the life history of the beech louse. Its attacks are frequently followed by beetles such as *Tomicus domesticus*, and *Lymexylon dermestoides*, and by the fungus *Nectria ditissima*, which kills the tree. The louse alone does not kill the tree. Means of control are suggested.—*W. N. Sparhawk.*

545. Eckstein. **Zuckererzeugung in den Lärchenwaldungen des Wallis. [Sugar production in the larch forests of Canton Wallis.]** Deutsch. Forstzeitg. 35: 195-196. 1920.—During the abnormally hot summer of 1919 the foliage of the larch stands in Canton Wallis, Switzerland, was covered with a white substance containing a large percentage of sugar. This was in the form of little balls 1–2 cm. in diameter and hundreds of pounds could be collected in a short time. It is supposed to have been due to the crystallization of "honey dew" secreted by the leaf louse *Lachnus laricis*. Somewhat similar is the "manna" produced by *Coccus manniparus* on *Tamarix mannifera* on the Sinai Peninsula, also a manna on oaks in Mesopotamia, one in Australia on eucalypts, one on *Cedrus libani*, and a similar product of unknown origin, in the vicinity of Briancon, France.—*W. N. Sparhawk.*

546. Elliott, F. A. **Airplane patrol of the forests.** Amer. Forestry 26: 206–208. *4 fig.* 1920.

547. Eulefeld. **Auffallende Erscheinung im Laubholzwald. [Peculiar phenomenon in deciduous forest.]** Deutsch. Forstzeitg. 35: 8-9. 1920.—In 1919 beech foliage in Germany turned brown much earlier and was darker colored than usual. Yet the leaves did not fall, even after considerable cold weather and snow. Possibly the abnormally dry summer did not permit free development of the winter buds, with consequent lack of enough pressure to push the leaves off. Due to the early drying of the foliage, many of the twigs are poorly lignified and will probably be winter-killed in case of very cold weather. Although the beech mast was very abundant in the fall of 1918, there was comparatively little germination, nor did the horns of deer develop as well as usual. This is thought to be because the abnormal 1918 season prevented the beechnuts from filling out.—*W. N. Sparhawk.*

548. Eulefeld. **Kurze Mitteilung von der Harznutzung im Jahre 1920. [Turpentining in 1920. (Should be 1919.)]** Deutsch. Forstzeitg. 35: 69. 1920.—Gives yields and net income from turpentining Scotch pine stands in Hesse, during 1919.—*W. N. Sparhawk.*

549. Fabricius. **Gründung einer Bayerischen Rinden-Verwertungs-Aktien-Gesellschaft. [Bavarian Tan-bark Exploitation Company.]** Forstwiss. Centralbl. 41: 474–475. 1919.—Germany consumed, in the year before the war, 80,000,000 kgm. of tannin, of which only 14,000,000 kgm. was produced from domestic materials (90,000,000 kgm. of oak and 45,000,000 kgm. of spruce bark). From Austria was imported from 25,000,000 to 36,000,000 kgm. of spruce bark. The spruce yields more tannin (11.5 per cent vs. 10 per cent for oak), but does not make as good leather as the oak. Germany could produce perpetually at least 220,000,000 kgm. of spruce bark per annum. Bavaria can produce 62,500,000 kgm., but thus far the bark has had to be shipped to extract plants in North Germany. The new corporation plans to build a plant in Bavaria. After the tannin has been extracted the bark will be made into briquettes for fuel in the plant and for sale. Its heat value is about equal to that of wood, peat, or Saxon lignite, about half that of good coal.—*W. N. Sparhawk.*

550. Fernow, B. E. [Rev. of: **New Jersey Department Conservation and Development, Annual Report, 1919.** Trenton, New Jersey, 1919.] Jour. Forestry 18: 165–166. 1920.

551. Fisher, R. T., and E. I. Terry. **Management of second growth white pine in central New England.** Jour. Forestry 18: 358–366. 1920.—Studies show that the shelterwood system is best adapted for white pine second growth in pure stands, using a combination of thinning with clear cutting. Reproduction is thus assured though there has been much trouble with snout beetles in seedlings and the pine weevil in saplings. Slash may be left on the ground in the mixed hardwood and pine stands but must be removed in pure pine stands as it wastes much space and precludes reproduction.—*E. N. Munns.*

552. Fitzwater, J. A. **Discussion of the Pinchot Committee report.** Jour. Forestry 18: 464–466. 1920.—Forest devastation in the Inland Empire (Northwest U. S. A.) has not been as severe as it has been depicted but there is need for a forest program handled by the Federal government rather than by the individual states. Acquisition of cut-over lands by the government is favored and the cost of conservative logging and mature timber should be borne by the public.—*E. N. Munns.*

553. Forbes, R. D. **Specialization vs. generalization in forestry education.** Jour. Forestry 18: 383–390. 1920.—See Bot. Absts. 6, Entry 501.

554. Green, Frederick J. **Germinative capacity of pine seed.** Quart. Jour. Forest 14: 140–141. 1920.—Scotch pine seed collected from trees of several ages was left exposed to the heat of an unused hothouse for one summer. It was sown the following spring and gave the following germination results: Seed from 15-year old trees, 87 per cent; from 30-year old trees, 50 per cent; from 45-year old trees, 30 per cent; from 60-year old trees, 15 per cent; from 110-year old trees, failure. These results agree with those discussed in another article, *Ibid.*, January, 1910.—*C. R. Tillotson.*

555. Greenfield, W. P. **The beech in Lincolnshire.** Quart. Jour. Forest. 13: 269–271. 1919.—This is a short discussion dealing with the lack of beech reproduction on the chalk Wolds of Lincolnshire, where there are many good beech woods but no natural beech regeneration. The author raises the question as to reasons for this, but does not answer it.—*C. R. Tillotson.*

556. Grieve, J. W. A. **The self-contained forest estate in the Himalayas.** Indian Forester 46: 273–279. 1920.—Each forest unit should become as self sustaining as possible, the unit to be the forest community. Forest and field crops may be grown simultaneously, and a group of skilled forest workmen evolved.—*E. N. Munns.*

557. Guthrie, John D. **Early English forest regulations.** Jour. Forestry 18: 530–541. 1920.—See Bot. Absts. 6, Entry 932.

558. Hagem, Oscar. **Svensk fröundersögelser. [Seed-testing in Sweden.]** Tidsskr. Skogbruk 28: 72–80. 1920. [A review of the report published by Edward Wiebeck.]—Both Wiebeck and the author found appreciable differences in the quality of Scotch pine and Norway spruce seed, the better seed coming from the warmer parts of these two countries. Wiebeck's investigations show that, for northern Sweden, 50 per cent or higher germination was obtained from seed collected where the isotherm for June to August was between 13 and 14°C.; the medium quality of seed, which germinated from 41 to 50 per cent, was collected where the isotherm for the same months was from 12 to 13°C.; and the poorer kind, which germinated only 40 per cent or less, was collected where the isotherm showed below 12°C. Hagem's results correspond quite generally with these, there being a discrepancy of only 0.5°C. —*J. A. Larsen.*

559. Hall, R. C. **The forest situation in France.** Jour. Forestry 18: 522–529. 1920.—The French forest policy of keeping 18 per cent of her land area in permanent forests was justified by the results in the Great War, for through her forests France was self sustaining and furnished the American and British armies with their wood supplies as well. With the coal supply virtually shut off, wood formed an important fuel. During the war the bulk of the cut came from the private forests, the government being reluctant to permit over-cutting in the state forests. The present problem in France is the restoration of the invaded region, the extent to which present needs can be met from the public forests, and the recuperation of private woodlands. Much of the invaded area will have to be replanted, which will be a long-time project, because of the great acreage, the high cost and the problem of ownership. For present needs over-cutting will be necessary, as the unfavorable financial exchange prevents importation. Private woodlands should be purchased now, but this is financially out of the question. The management of private lands has long been unsatisfactory and some further measures of state control are being advocated.—*E. N. Munns.*

560. Haslund, Ole. **Granens Stammeform.** [**Form factor and form-class of Norway spruce.**] Tidsskr. Skogbruk 28: 44–53. *Fig. 4.* 1920.—By making use of the fact that the form factor varies according to the form-point, which is a relation between form of crown and form of stem, certain characteristic relations of crown, form, diameter and height are expressed and the variations of these according to the site and density of the stands. The form classes are expressed as 0.55, 0.60, 0.65, 0.70 and 0.75, the last being the best form. A tree of 40 cm. diameter breast high in the 0.55-class has a crown diameter of 5.5 m., and a tree of the same diameter of stem but in the 0.70-form class has a crown diameter of only 4.3 m. Trees of the first kind need an area of 30.25 sq. m., while those of the latter require only 18.49 sq. m. In the first class there would be 33 trees per dekar (0.1 hectar) and those of the 0.70 class would stand 54 per dekar. From this study it is concluded, among other things, that it is very poor policy to cut in such a manner as to open the stand sufficiently to lower the form class. —*J. A. Larsen.*

561. Havelock, W. B. **Common and Japanese larch at Brocklesby Park.** Quart. Jour. Forest. 14: 59–61. 1920.—Comparisons of the growth at Brocklesby Park, England, of Japanese and European larch, which was set out in 1903–04, spaced 4 by 4 feet and mixed with hardwoods in the proportion of two softwoods to one hardwood. Measurements, presumably in the winter of 1919–20, show the following average girths of trees on an area which has been thinned three times: Japanese larch, 14 inches; sycamore, 11.2 inches; ash, 9.7 inches; elm, etc., 9.4 inches. On another area, twice thinned, European larch has an average girth of 13.1 inches; sycamore, 11 inches, ash, 9.6 inches, beech, 5.4 inches; and other hardwoods, 8.1 inches. [See also following Entries, 562, 563.]—*C. R. Tillotson.*

562. Havelock, W. B. **European and Japanese larch at Brocklesby Park.** Quart. Jour. Forest. 14: 101–103. 1920.—The growth of both European and Japanese larches in mixture with various hardwoods is discussed briefly. The larches in every instance have exceeded the other species in rate of growth. [See also next preceding and next following Entries, 561, 563.]—*C. R. Tillotson.*

563. Havelock, W. B. **The western larch (Larix occidentalis) on the Brocklesby Park estate, Lincolnshire.** Quart. Jour. Forest. 14: 96–100. 1920.—*Larix occidentalis* on this estate is longer in establishing itself than either the European or Japanese species but in the power of resistance to frost and drought, there does not appear to be much difference between them. It does not appear to thrive where there is thick grass in the plantation at first. Its height growth in the young stage is inferior to the European and Japanese larches. Shelter appears to be desirable for it in its early years. [See also preceding entries, 561, 562.]—*C. R. Tillotson.*

564. Hiley, W. E. **The mean annual forest per cent.** Quart. Jour. Forest. 13: 156–165. 1919.—By the use of the soil expectation value formula and a money yield table for Scots pine,

the writer has constructed a graph from which he can read the mean annual forest per cent for that species when the soil value and rotation are known or assumed. From this graph the optimum financial rotation, the loss due to cutting woods before the financial rotation is reached, and the price which may be paid for land for afforestation (assuming a certain interest rate and rotation) can also be readily determined.—*C. R. Tillotson.*

565. Hofmann, J. V. **How fires destroy our forests.** Amer. Forestry 26: 329–336. *17 fig.* 1920.

566. Hopkinson, A. D. **A note on the financial results of pine and beech forests in Normandy.** Trans. Roy. Scot. Arbor. Soc. 34: 82–87. 1920.—With Scotch pine grown in an 80-year and beech in a 190-year rotation, the pine is nearly five times as advantageous as the beech from a purely financial point of view. This is partly accounted for by the fact that this rotation for beech is not its financial rotation while 80 years is perhaps the financial rotation for pine. From the silvicultural point of view, the advantage is certainly with the beech, which as a pure crop has many advantages which can not be assigned to extensive areas of pure pine.—*C. R. Tillotson.*

567. Hutchins, D. E. **The forests of New Zealand.** Trans. Roy. Scot. Arbor. Soc. 33: 119–123. 1919.—The forests of New Zealand are the best softwood forests in the southern hemisphere. They have never been surveyed and only vague estimates have been made of their area and stand of timber. The output of sawn timber indicates that over the area milled the stand has been 2½ times that of the average of the virgin forests of America. Over small areas some timber stands of 200,000 superficial feet per acre have been recorded. New Zealand timbers excel those of Europe in quality, but are less desirable than those of America. The value of kauri timber is well known, but it is not generally known that it is the largest timber-producing tree in the world, on account of the small taper of its trunk. There was 3,000,000 acres of kauri forest in New Zealand; very little is now left but there are about 500,000 acres that are restorable. Totara, the next most valuable New Zealand timber, is the best of all the world's *Podocarpus* timbers. The most valuable forests now left in New Zealand are of totara. Rimu, the common housebuilding timber, is beautiful, fine figured and surpasses oak in color and grain.—In 1909 the forest area of New Zealand was estimated at 17,000,000 acres. The New Zealand forests are worth more than all the known mineral wealth of the Dominion and they offer more employment than any other industry. Forest plantations are about 30,000 acres in extent and have cost about 13 pounds per acre.—*C. R. Tillotson.*

568. Hutchins, D. E. **Rate of growth of trees in relation to forestry. A criticism of Mr. E. Maxwell's paper.** New Zealand Jour. Sci. Tech. 3: 1–7. 1920.—To consider growth of individual trees instead of forests is misleading. The five chief native timber trees of New Zealand in their forests grow faster than the five chief timber trees of Europe in theirs. While introduced trees should be planted, native ones should also be conserved. [See also Bot. Absts. 6, Entry 588.]—*A. Gundersen.*

569. Hutchins, D. E. **Waipona kauri forest.** New Zealand Jour. Sci. Tech. 2: 412. 1919.—See also Bot. Absts. 6, Entry 624.

570. Illick, J. S. **Management of the state forests of Pennsylvania.** Amer. Forestry 26: 339–342. *8 fig.* 1920.

571. Illick, J. S. **Some silvicultural problems in Pennsylvania.** Jour. Forestry 18: 502–511. 1920.—Forest planting includes some of the main problems of forestry. Planting of over 33,000,000 trees by the State with from 33 to 79 per cent of the various species living, shows that planting can be successfully done here. Most of the planting has been in the spring but successes of from 72 to 92 per cent for fall planting show this season is also suitable. The cost of planting ranges from $4.20 to $10.77 per thousand, 1919 costs being only $8.64 a

thousand as against an average of $6.05. Fire loss, in spite of local high hazards, amounts to only 0.03 per cent. In the past ten years over 9,000,000 trees have been distributed to private individuals, water companies planting 1,750,000 trees. Other planters include farmers, mining companies, municipalities, lumbermen, hunting and recreation clubs, and educational institutions.—*E. N. Munns.*

572. Ivy, T. P. **Forestry, livestock and cut-over lands of the south.** Amer. Forestry 26: 299–302. *6 fig.* 1920.

573. Jardine, J. T. **Efficient regulation of grazing in relation to timber production.** Jour. Forestry 18: 367–382. 1920.—Investigations have shown that there is a grave danger from sheep grazing to reproduction of the valuable timber species of the western United States through overgrazing, trampling and browsing, though under certain circumstances sheep may be of value in getting it established. Sheep may be an aid in the reduction of the forest-fire hazard through destruction of the fuel on the ground and the cutting up of litter and duff. The present needs in National Forest administration are for a policy to govern grazing, to either recognize grazing as having a place in forest management or to limit its growing use, and to provide for investigations to enable proper grazing regulation and inspection.—*E. N. Munns.*

574. Johannes, Gunnar. **Et lidet inleg for anvendelsen af 2/0 furu of nogle bemerkninger om planteskole og plantearbeide. [Notes on the use of 2–0 (Scotch) pine and remarks on nursery and labor conditions.]** Tidsskr. Skogbruk 28: 54–60. *1 pl.* 1920.—In view of the greatly increased cost of raising nursery stock and of establishing plantations, and the unusual success attending the planting of 2-0 nursery stock in the littoral belt of Sweden, the author urges greater use of this stock and the employment of school children wherever possible.—*J. A. Larsen.*

575. Kay, James. **Red pine or Norway pine (Pinus resinosa).** Trans. Roy. Scot. Arbor. Soc. 33: 157–161. 1919.—This is a discussion of the commercial importance, silvical characteristics and quality of wood of the red or Norway pine and in tabular form presents a comparison of the form factors, form quotients, and volumes of red and white pine for trees up to 9 inches in diameter.—*C. R. Tillotson.*

576. Kirkland, Burt P. **The democracy of national control.** Jour. Forestry 18: 448–450. 1920.—A comparison of state action in legislature with that of the federal government does not show to the advantage of the former. If the forest policy is left to state control, the nation will be no better off than at present and it is inconceivable, in the light of past experience, that adjoining states would treat the same subject in the same way.—*E. N. Munns.*

577. Kirkland, Burt P. **Effects of destructive lumbering on labor.** Jour. Forestry 18: 318–320. 1920.—The policy of unrestricted destructive lumbering leads to a disorganization of labor resulting in a denial of normal family life and the right of suffrage, and leading to irregularity of employment. Labor has no interest in the industry and holds a feeling of injustice which is largely responsible for ultra-radical doctrines.—*E. N. Munns.*

578. Kittredge, Joseph, Jr. **Silvicultural practice in coppice-under-standard forests of eastern France.** Jour. Forestry 18: 512–521. 1920.—The mixed hardwood forests of France are managed to furnish a sustained annual yield with an area regulation. Coppice is used chiefly as cordwood and is ready for cutting at an average age of 30 years; the standards are in multiples of the age of the coppice stands. Marking is done by a technical forester upon all lands, regardless of ownership, and, while concerned with reserving the best trees, the uniformity of the stand is excellent. The regulations governing the sales are printed in pamphlet form for all France and a number of the clauses are given in full. The average yield is from 500 to 1000 board-feet per acre, in logs, with an average of ten cords of wood per acre, of which about one-half is from 3 to 6 inches in diameter.—*E. N. Munns.*

579. Koch, Elers. **Discussion of the Pinchot Committee report.** Jour. Forestry 18: 458–460. 1920.—The plan of the Pinchot Committee is believed idealistic, and not feasible. The time is not ripe for such a program of forest policy, but attention should be concentrated on the fire problem, and forest-fire control by the states will go farther than national control of lumbering.—*E. N. Munns.*

580. Koehler, A. [Rev. of: Wilson, T. R. C. **Effect of kiln drying on the strength of airplane parts.** Rept. No. 68, Nation. Advisory Committee for Aeronautics. Washington, D. C., 1920.] Jour. Forestry 18: 421–423. 1920.

581. Leopold, Aldo. **Forestry of the prophets.** Jour. Forestry 18: 412–419. 1920.—See Bot. Absts. 6, Entry 940.

582. Löwinger, Eugen. **Polens Fortswirtschaft und Deutschland.** [Poland's forestry and Germany.] Deutsch. Forstzeitg. 35: 195. 1920.—In order to import needed materials Poland must export raw material, particularly forest products. The Polish government is encouraging cutting of timber for this purpose as well as to supply home needs, and is backing a large private sawmill company which is to saw lumber for home and foreign trade. A 15,000 hectare tract of virgin forest in the province of Grodno has been made available for exploitation.—*W. N. Sparhawk.*

583. Ludwig. **Gewinnung von Gerbrinden mittels Dampfschälung.** [Use of steam in harvesting tan-bark.] Forstwiss. Centralbl. 41: 401–404. 1919.—Scarcity of tanning material during the war led to the discovery that not only oak bark, but even that of spruce, is of great value for tanning. The use of domestic products will continue, as far as possible, because of high prices for quebracho, high freight rates, and unfavorable financial exchange. Harvesting of bark has heretofore been possible only between May and July or August. Experiments have shown that bark can be removed at any time by the use of steam, very much more cheaply than in the old way and without impairing its value. Gutschow invented a portable steaming and drying apparatus that could be taken into the woods. Oak bark, usually directly used, must be thoroughly dried; spruce bark is more often extracted and only a little drying is required. Less steaming is required if the bolts are steamed while green, and there is also less loss of tannin due to weathering. The use of spruce bark for tanning has special significance for the paper and pulp industry, since the bark has to be removed for pulp making and has not hitherto been utilized. It can now be sold as tanning material, for enough to pay the cost of removal and give a good profit besides.—*W. N. Sparhawk.*

584. MacLarty, Alexander S. **Forest tree seed.** Trans. Roy. Scot. Arbor. Soc. 33: 138–146. 1919.—This paper discusses several points which should be given consideration in the collection of forest tree seed.—*C. R. Tillotson.*

585. Makins, F. K. **Natural reproduction of sal, Shorea robusta, in Singhbhum.** Indian Forester 46: 292–297. *Pl. 16–18.* 1920.—Sal reproduction is satisfactory where drought is not severe, but much of the region considered has long periods of dry weather; only about 20 per cent of the forest area has reproduction. Deposition and evaporation of dew have an important influence on sal. Heavy shade appears to be a benefit but heavy litter prevents establishment. Young sal plants require assistance in making their way through climbing plants, while non-climbers act as a nurse crop. A grass cover does not prevent sal establishment though better results are obtained after burning.—*E. N. Munns.*

586. Mason, Fred. **Discussion of the Pinchot Committee report.** Jour. Forestry 18: 451–458. 1920.—Exception is taken to the Committee's attitude towards the lumbermen, who are not to blame for the living conditions and the labor troubles within the industry. Forest destruction by the lumber interests is not a needless act, but is forced by economic conditions. Finances in the lumber industry have been so entangled that conservation could not be practiced, though some measures have been forced upon them. Measures which are feasible include a yield tax, a forest loan board, and the purchase of forest-producing lands by the public. An educational program is suggested to teach lumber conservation in all phases of its use.—*E. N. Munns.*

587. Mason, W. H. **Planting in pits.** Quart. Jour. Forest. **14**: 141–142. 1920.—The planting of larch in pits where the turf was cast, grass down, into the bottom of the pit and finely chopped up, resulted in complete failure of the plantation. The sod at the bottom of the pits, it was discovered, had rotted away, leaving a cavity into which all the moisture around the tree drained.—*C. R. Tillotson.*

588. Maxwell, E. **Rate of growth of indigenous and exotic trees in New Zealand. Comparison of the rate of growth in relation to its bearing on forestry.** New Zealand Jour. Sci. Tech. **2**: 371–376. *3 tables.* 1919.—Waste of native forests has brought these near extinction. Introduced trees grow much more rapidly than native ones. Considers *Sequoia sempervirens* especially destined to play a very important part in future New Zealand forestry. [See also Bot. Absts. 6, Entry 568.]—*A. Gundersen.*

589. Meredith, E. T. **Forests as a farm crop.** Amer. Forestry **26**: 337–338, 342. 1920.

590. Meredith, E. T. **Need of forests for wood pulp.** Amer. Forestry **26**: 362–363. 1920. [From a letter to the American Paper and Pulp Association.]

591. Moore, Barrington. [Rev. of: Brown, Nelson C. **Forest products, their manufacture and use.** *471 p., 120 fig.* John Wiley & Sons: New York, 1919.] Torreya **20**: 57–59. 1920.—The book treats of the history, process of manufacture, and use of the principal forest products. Of special interest is information on sources of supply with relation to present and future forest resources. The book is well illustrated and provided with an index.—*J. C. Nelson.*

592. Morrison, W. G. **Some proposals with regard to natural afforestation in a New Zealand mountain area.** New Zealand Jour. Sci. Tech. **2**: 339–349. 1919.

593. Munger, T. T. **Forestry in the Douglas fir region.** Amer. Forestry **26**: 199–205. *7 fig.* 1920.

594. Murray, J. M. **Variation in the Scots pine (Pinus silvestris, L.).** Trans. Roy. Scot. Arbor. Soc. **34**: 87–91. 1920.—*C. R. Tillotson.*

595. Olmsted, Frederick E. **Business phases of forest devastation.** Jour. Forestry **18**: 311–316. 1920.—The provisions of the Committee for Application of Forestry to correct certain business practices of the lumber industry, are necessary to carry out the program as a whole, since forestry would have to control prices, capitalization and other business conditions. Arguments are presented showing silviculture to be a business as well as an art and science, for problems of labor, production, distribution and costs must be met.—*E. N. Munns.*

596. Parkin, John. **A plea for the consideration of the aesthetic side in restocking our war-felled woods.** Quart. Jour. Forest. **13**: 254–265. 1919.—See also next following Entry, 597.

597. Parkin, John. **A plea for the consideration of the aesthetic side in restocking our war-felled woods.** Quart. Jour. Forest. **14**: 33–48. 1920.—See also next preceding Entry, 596.

598. Parnell, R. **Hazara Forest Division, North-West Frontier Province.** Indian Forester **46**: 224–237. *5 fig.* 1920.—The business of the Hazara Forest from 1880 to 1920 is summarized and analyzed as to improvements, law cases, fires, products and finances.—*E. N. Munns.*

599. Pearce, W. J. **Relation of insect losses to sustained forest yield.** Jour. Forestry **18**: 406–411. 1920.—Insects, especially the Dendroctonus beetles have an important place in the future management of forests. It was estimated on the Dolores timber survey project in Colorado that in the life of the stand (about 300 years) 90 per cent of the trees, by volume,

were killed by insects and 19 per cent by other causes. This amounts to a loss of $\frac{1}{3}$ per cent per annum, which is less than in pine stands. Insects will be an important feature in future timber-sale practice, through their effect upon the reserved stand and upon the black-jack stage of the western yellow pine.—*E. N. Munns.*

600. Peters, J. G. **Co-operation between the federal government and the states.** Jour. Forestry 18: 477–485. 1920.—The whole question of a national forest policy devolves upon the finances. Acquisition of forests by the federal government is slow and can not keep up with denudation. State acquisition of cut-over lands is desirable on a large scale, but the cost is more than the states can bear. Planting of denuded lands is badly needed and the nation, the states and private owners should each bear a part in the cost. Fire protection through the present Week's law will assure the maintenance of present areas of young stands and will aid nature in reforesting large areas, but additional funds are necessary to make the plan of real nation-wide benefit. Farm forestry has a real place in the forest program, supplying part of the needs of the rural population.—*E. N. Munns.*

601. Peyton, Jeannie S. **Forestry movement of the seventies, in the Interior Department, under Schurz.** Jour. Forestry 18: 391–405. 1920.—A history of the four years of the forestry movement in the United States of America under Secretary Carl Schurz and General James A. Williamson, Commissioner of the General Land office. The bills drafted and not passed by Congress in that period were forerunners of the present system of forest administration and regulation.—*E. N. Munns.*

602. Pinchot, Gifford. **Where we stand.** Jour. Forestry 18: 441–447. 1920.—A résumé of the principal arguments against the proposed national forest policy for the United States shows the objection because of possible confiscation is merely an attempt to dodge the main issue. The constitutionality of the measure must be passed upon after the laws have been drawn up. The national government is better able to handle the administration of a forest policy than are the individual states, while the fear of bureaucracy is not supported by past developments. There is an awakening of the forestry profession to the realization of the need of such a policy, and their activity in its favor.—*E. N. Munns.*

603. Preston, John F. **Discussion of the Pinchot Committee report.** Jour. Forestry 18: 460–464. 1920.—Federal action in a forest program is needed, but the proposed plan is wrong in attempting to force the measure upon the lumber industry rather than having it come about through education. The state is the strongest point in the unit and state legislation should be sufficient to bring about the desired end. Coöperation with the lumbermen is to be desired in any plan.—*E. N. Munns.*

604. Rane, F. W. **Use of wood for fuel.** Proc. Soc. Promotion Agric. Sci. 39: 48–53. 1919.—Attention is called to the availability and value of wood for fuel, especially in New England. The suggestion is made that wood obtained in clearing out wood-lots and from forest trees unsalable as lumber be cut into lengths suitable for use in stoves, furnaces, and fireplaces instead of into 4-foot or cord-wood lengths, as at present. The utilization of wood in the production of different chemicals is pointed out as a future asset of great value to the United States.—*H. N. Vinall.*

605. Ridsdale, P. S. **The memorial trees of the United States.** Garden Mag. 30: 177–180. *2 fig.* 1920.

606. [Ridsdale, P. S.] **State forests in Massachusetts.** Amer. Forestry 26: 323. 1920.

607. Riemenschneider. **Die preussische Forstverwaltung und das Landwirtschaftsministerium.** [**The Prussian Forest Service and the Ministry of Agriculture.**] Deutsch. Forstzeitg. 35: 170–171. 1920.—The Forest Service was transferred from the Ministry of Finance to that of Agriculture in 1880. It is suggested that this change has not proved altogether

for the best. Even though, in its former place, financial considerations may have been given undue weight, now agricultural interests are favored often to the detriment of the forests. Charges for by-products of the forest—pasturage, litter, seedlings, twigs for broom-making—have not been increased with the rise in other prices, and in many cases have been reduced since the war started. They now bear no relation to the cost of supervision. Both the forest and the public treasury would benefit if the Ministry of Finance were again in control.—*W. N. Sparhawk.*

608. Robinson, R. L. **Forest policy.** Quart. Jour. Forest. **14**: 82–95. 1920.—This paper treats broadly of the pre-war development of forest policy particularly in the United Kingdom, although briefly also of that in other countries, discusses the part played by timber in the war, and summarizes what the author believes to be the main principles that underlie the development of forest policy.—*C. R. Tillotson.*

609. Roth, Filibert. **Great teacher of forestry retires.** Amer. Forestry **26**: 209–212. *1 portrait.* 1920.—Appreciation of B. E. Fernow. [See Bot. Absts. 6, Entry 958.]

610. Rubner. [Rev. of: Grebe, C. **Studien zur Biologie und Geographie der Laubmoose. I. Biologie und Ökologie der Laubmoose.** (**Studies on the biology and geography of foliaceous mosses. I. Biology and ecology of foliaceous mosses.**) Reprint from Hedwigia **59**: 1917.] Forstwiss Centralbl. **41**: 431–433. 1919.—Rubner points out the need for a thorough study of forest mosses and their interrelation with soil conditions and with the composition of the forest.—*W. N. Sparhawk.*

611. Sampson, Arthur W. [Rev. of: Hitchcock, A. S. **Genera of grasses in the United States, with special reference to economic species.** U. S. Dept. Agric. Bull. 772. *307 p.* 1920.] Jour. Forestry **18**: 426–427. 1920.

612. Schlich, Sir William. **Forestry in the Dominion of New Zealand.** New Zealand Jour. Sci. Tech. **1**: 201–210. 1918. [Slightly abridged from Quart. Jour. Forest. **12**: 1–28. 1918.]—See also Bot. Absts. **1**, Entry 1456.

613. Schwappach, A. **Waldbauvereine.** [**Societies for forest culture.**] Deutsch. Forst. zeitg. **35**: 37–39. 1920.—Many societies for the practice of forestry have been formed recently in several Prussian provinces. They are voluntary associations of small owners who agree to manage their forests in accordance with technical advice to be given them by the Agricultural Council (Landwirtschaftskammer). The purpose is two-fold: first, to increase wood production on the now poorly managed small private holdings; second, to prevent compulsory coöperative management under strict state control. Schwappach fears that they will not be effective, and inclines to the belief that compulsory coöperative forests, managed by responsible officers and subject to state supervision, will be found necessary to increase the yield from small holdings.—*W. N. Sparhawk.*

614. Seybold, Karl. **Die Forstwirtschaft der Tatsachen (natürlicher Hochwaldbetrieb).** [**Forestry based on nature.**] Forstwiss. Centralbl. **41**: 405–426. 1919.—Advocates getting away from theory and arbitrary rules and methods in forest management, with a closer adherence to natural laws and the phenomena of forest growth. Accurate prediction of growth for long periods is impossible, and the most carefully made theoretical working plans are always sooner or later upset by natural influences, such as windfall, drouth, frost, insects, fires, failure of seed years, and the like. The system proposed has been tried out since 1900 on a 5,000-hectare fir and beech forest in Alsace. An essential feature is the 5-year cutting cycle, by which every part of the forest is gone over every 5 years. This makes possible the removal of diseased, suppressed, and ripe trees and groups of trees at the most suitable time, and is especially favorable to growth of the remaining trees and to natural reproduction. Another feature is the maintenance of a continuous forest cover, unbroken by clearings except where they result from accident. The frequent cuttings insure light and ventilation. Instead of

extensive, pure, even-aged stands, the age classes are mixed together in small groups, as usually occurs in nature, so that the forest takes on the appearance of a selection forest. Because of the long periods required for trees to mature, soil exhaustion can not be prevented by rotation of crops as easily as with other crops. The same result can be obtained, however, by using mixed stands, composed of species with different soil requirements. The beech is especially valuable for improving soil fertility, as well as for favoring better development of the associated conifers, and its proportion in the stand can be varied from time to time as conditions require. Other species, such as oak, maple, ash, elm, birch, alder, and Scotch pine, may also be used with beech, provided they are given several years start and are planted in large enough groups so that they will not be shaded out. For purposes of management forests should be divided into compartments of an average size of not more than 10 hectares. At the 5-year intervals, cutting is done, not in accordance with a predetermined working plan, but according to the actual silvicultural needs of each individual compartment, and also according to current market conditions. In some, no cutting at all may be done; others may be cut very heavily. The usual method of determining the annual cut is very complicated, involves much manipulation of figures, and can not be accurate. The average increment and the allowable cut can be better and more simply determined from a series of small permanent sample plots on the different sites, to be cut over regularly with the rest of the stand. Other advantages of the method described are the more intensive and careful handling of the forest, and the great simplicity and flexibility of the working plans.—*W. N. Sparhawk.*

615. Shepard, E. C. **Comments on the forestry program.** Jour. Forestry 18: 467–471. 1920.—The national forest policy, as prepared, is censured because it was prepared by foresters without the coöperation of the lumbermen, and because it calls the lumber industry to task for the lack of policy on the part of the government in the early days when timber lands were sold for nominal prices. France required hundreds of years to formulate and put into practice a substantial forest policy, and too quick an action in the United States, to which this paper refers, may prove a drawback to the whole plan.—*E. N. Munns.*

616. Silcox, F. A. **Forestry and labor.** Jour. Forestry 18: 317. 1920.—Labor is vitally affected by the economic condition of the lumber industry and the character of exploitation growing out of it. If the industry does not adopt democratic industrial relation policies voluntarily, it probably will be forced to this.—*E. N. Munns.*

617. Simon. **Ein Beitrag zur Erhöhung der Einnahmen aus den Forsten.** [Suggestions for increasing revenue from forests.] Deutsch. Forstzeitg. 35: 131–133. 1920.—The problem of increasing net returns from forests is very important in Germany today. This may be done by (1) reducing costs of production, (2) increasing volume production, or (3) increasing returns from wood. Artificial regeneration should, wherever possible, give way to natural reproduction, and where this is impossible the cheapest and most effective methods should be used. Reproducing areas should be carefully protected, especially against grazing. Thinnings should be made in such ways as to promote the most rapid volume growth. Forest officers, who will be responsible for all this work, should be thoroughly and carefully trained for it, and should be so treated that they will do the best work. Wood should be sold for the best prices possible, and, to this end, roads and other means of transportation should be kept in good condition. Low wood prices will not benefit the consumers, because the dealers will absorb all the margins. State sawmills are not favored until the point of view of laborers changes; i.e., until they become free from the idea that a government job is only a sort of pension.—*W. N. Sparhawk.*

618. Sklavunos, Constantine G. **Die Forstverhältnisse im heutigen Griechenland.** [Forest conditions of modern Greece.] Forstwiss. Centralbl. 41: 81–90, 173–184, 249–264. 1919.—All of Greece was well forested in prehistoric times, but the forest was reduced to about its present extent during the Homeric and post-Homeric periods. Most of the accessible forests near the coasts have gone, but there are still dense virgin stands in the mountains of the interior. There are three main forest zones:—(a) Evergreen hardwoods (0–800 m. eleva-

tion) with a dry subtype (0–500 m.) including such species as *Pistacia lentiscus, Olea Europaea, Juniperus Thoenica, Tamarix Hampeana, Quercus aegilops, Pinus pinea*; and a cooler subtype, characterized by *Quercus coccifera, Q. ilex, Arbutus unedo, A. andrachne, Myrtus communis, Laurus nobilis, Buxus sempervirens, Styrax officinalis, Celtis australis, Rhus cotinus, Ficus carica, Morus alba, M. nigra.* Common to both subtypes are: *Pinus silvestris* (in Macedonia), *P. halepensis, Cupressus sempervirens, Robinia pseudacacia, Alnus glutinosa,* and others. (b) Deciduous hardwoods (800–1500 m.), characterized at lower elevations by oaks, especially *Quercus robur, Q. conferta, Q. pedunculiflora, Q. pubescens, Q. pedunculata, Q. sessiliflora, Q. cerris*; higher up chestnut (*Castanea vesca*) is common. Other common trees of this zone are ashes, hornbeams, walnut, aspen, sycamore, elms, horsechestnut, maple, lindens, dogwood, hazel, beech. (c) Conifers (1500–2000 m.) comprising *Abies cephalonica, Pinus laricio* (*corsicana*), *P. leucodermis, P. peuce, Taxus baccata, Juniperus foetidissima, J. oxycedrus.*—Conifer forests (especially fir) occupy 55 per cent of the forest area. The stands are open, all-aged, and reproduction is seriously retarded by overgrazing. Growth is fairly rapid because of the long growing season and high mean temperatures. The total forest area, while not definitely known, owing to lack of surveys, is estimated at 1,800,000 hectares, including scrub forest, or 15 per cent of the total area of the new Greece (including territory added after Balkan wars). This is 0.38 ha. per capita. At least 6,600,000 hectares is absolute forest soil. The forests are very unevenly distributed, increasing from the South and east toward the north and west, and are most extensive in northern Greece and in Greek Macedonia. Forest destruction still continues, due to heavy overgrazing (especially by goats), wasteful and unregulated cutting, turpentining, charcoal making and lime burning, and insect depredations.—A large proportion of the forests belongs to the State, considerable to communes and monasteries, and a smaller proportion to private individuals. The private forests receive the best treatment, the communal and monastic forests the worst, and the State forests halfway between.—The development of a forest policy began in 1836, soon after the establishment of the monarchy. Cutting of saw timber from either State or private forests may be done only on permit, which is issued after the payment of a felling tax. Grazing on private forests is also subject to tax, but is free on public forests. The public forests are guarded by 250 forest guards, with 12 technically trained foresters and 3 inspectors, under the Forest Division of the Ministry for National Economy. This force is much too small, and is not well trained. The first forest school was established at Vytina in 1896 to train the lower personnel. A higher forest institute for training administrative officers is to be established at Athens by 1920. Various measures have been taken to encourage afforestation by communes and private individuals, and something has been accomplished.—The total annual yield of the forests of old Greece (figures for recently acquired territory not available) is estimated to be 1,720,566 cubic meters, probably in excess of the annual growth. In addition, Greece imports 126,000 cubic meters of wood (principally softwood construction material), making the per capita consumption 0.75 cubic meters. Imports came (1911) chiefly from Austria-Hungary, Roumania, Turkey, and Russia, and were exceeded in value only by grain and by coal. Exports, chiefly valonia and nutgalls for tanning, and turpentine and rosin, went mostly to Austria, Germany, Italy, and Turkey.—*W. N. Sparhawk.*

619. Smythies, E. A. **Geology and forest distribution.** Indian Forester **46**: 319–320. 1920.—Geological features determine soil types, which determine water supply, soil depth, and soil aeration, so that geology is important in plant distribution.—*E. N. Munns.*

620. Speight, R. **New Zealand timbers and the borer.** New Zealand Jour. Sci. Tech. **1**: 142–144. 1918.—List of eighty species of which some were attacked by borer (*Anobium domesticum*) in Canterbury Museum.—*A. Gundersen.*

621. Steven, H. M. **Coniferous forest trees in Great Britain.** Trans. Roy. Scot. Arbor. Soc. **34**: 61–82. 1920.—This article deals with the various conifers of importance in British forestry. Their growth under different conditions of soil, elevation, exposure, etc., is considered; their environmental requirements and the principal silvicultural problems that arise in the growing of each conifer are discussed.—*C. R. Tillotson.*

622. Stevens, Carl M. **Forest industries and the income tax.** Jour. Forestry 18: 329–337. 1920.—A history of the development of the present United States income tax is given with its aims, organization and administration.—*E. N. Munns.*

623. T., E. P. [Rev. of: Surface, Henry E. **Feasibility of manufacturing paper from pulp from Tasmanian timbers.** Rept. Dept. Lands and Survey of Tasmania for 1914-1915. *P. 33–43.* Hobart, 1915.] New Zealand Jour. Sci. Tech. 1: 379–380. 1918.—One of the timbers the pulping qualities of which were investigated was *Nothofagus Cunninghamii*, known in Tasmania as "myrtle," and closely related to a timber similar to *Nothofagus Menziesii* (bushman's "silver birch," or "southland beech" of timber traders). Author recommends that, as a purely business enterprise, the utilization of Tasmanian hardwoods for pulp or paper making should not be given further consideration. Their fibers are too short. He also studied swamp gum (*Eucalyptus regnaris*), blue gum (*E. Globulus*), stringy bark (*E. obliqua*), and silver wattle (*Acacia dealbata*), none of which is suitable for paper pulp. Tasmanian manufacture of paper pulp for sale would not be a profitable undertaking.—*C. S. Gager.*

624. T., J. A. [Rev. of: Hutchins, D. E. **Waipona Kauri forest, its demarcation and management.** *63 p. Illus., map.* Lands and Survey Dept.: Wellington, New Zealand. 1918.] New Zealand Jour. Sci. Tech. 2: 223–224. 1919.—As now demarked by Hutchins, the Waipona forest is eleven miles long from east to west, and nearly nine miles broad from north to south, including 29,830 acres, of which 28,880 are occupied by the main block of forest. The total timber stand of the forest is estimated at 288,020,000 superficial feet of timber. A working plan for the forest is outlined. It is anticipated that the forest will become as well known in Australasia as the Black Forest is in Germany. [See also Bot. Absts. 6, Entry 569.] —*C. S. Gager.*

625. Terry, E. I. **Public acquisition or control.** Jour. Forestry 18: 324–325. 1920.—Differing from the plans so far proposed, it is believed the main objective of the United States forest policy should be the public acquisition of two-thirds of the private timber lands of the country within forty years.—*E. N. Munns.*

626. Tierney, D. P. **The cut-over land problem.** Jour. Forestry 18: 498–501. 1920.—There are no means at present adequate to safeguard the millions of acres of restocking forest land in the United States from indiscriminate cutting and waste. This is due to dependence of forest management upon annual appropriations from legislative bodies. More attention should be given to securing a known fund without having to persuade a legislative body to make this appropriation annually. A forest program should begin with restocking lands first, before acquiring lands on which forests will have to be established. Land purchases should be restricted to watershed-protection areas and lands close to areas now under forest management.—*E. N. Munns.*

627. Toumey, J. W. [Rev. of: Ise, John. **United States forest policy.** *395 p.* Yale Univ. Press: New Haven, 1920.] Jour. Forestry 18: 558–560. 1920.—The work is that of an economist and historian, who develops the history of the present policy without reservations. As to a future policy, too little consideration is given, especially with the present forestry-policy movement under way.—*E. N. Munns.*

628. Toumey, J. W. [Rev. of: Pulling, Howard E. **Sunlight and its measurement.** Plant World 20: 151–171, 187–209. 1918.] Jour. Forestry 18: 431–433. 1920.

629. Turner, J. E. C. **Lopping in the Kumaon Circle, United Provinces.** Indian Forester 46: 240–247. 1920.—Nomadic native tribes still practice destructive cutting of all live branches of oak for their flocks during heavy snowfall, when other browse is unavailable despite rules that permit only the cutting of the lower two-thirds of the branches. This is resulting in the destruction of the oak forest and of grazing values when practiced constantly. Recommendations are made to prevent such action.—*E. N. Munns.*

630. Vestby, P. **Spredte träk fra en skogbefaring i Chili. [Sketches from a trip to Chilian forests.]** Tidsskr. Skogbruk **28**: 17–27. *Pl. 1.* 1920.

631. von dem Busche. **Schutz und Anbau der Eibe. [Protection and propagation of the yew.]** Deutsch. Forstzeitg. **35**: 21. 1920.—An order from the Minister of Agriculture, Domains, and Forests, for preventing the extinction of yew in German forests.—*W. N. Sparhawk.*

632. von Mammen. **Forstwirtschaft, Holzhandel und Holzindustrie in Ostpreussen. [Forestry and wood industry in East Prussia.]** Forstwiss. Centralbl. **41**: 368–388. 1919.—Wooded area in 1913 was 660,841 hectares, or 17.7 per cent of the land area. The forests were divided into 23,120 tracts, of which 22,942 were connected with farms, 84 per cent were under 10 hectares in size, and made up but 7.9 per cent of the total area; the 111 tracts greater than 1,000 hectares comprised 68.5 per cent of the total area. Deciduous species occupied 21.7 per cent of the area, or 143,395 hectares; two-thirds of this was high forest, divided into three types, oak, birch-alder-ash, beech and others, at about a 1–3–1 ratio. Conifers occupied 517,536 hectares (78.3 per cent) of which 96,132 *ha* were selection forest and the rest high forest. Scotch pine covered 338,629 *ha*, spruce 168,100 *ha*, white fir 10,524 *ha*, and larch 283 *ha*. Pine predominates on the sandy soils of the south, spruce on the loams in the northern and central districts, oak on the best soils, while hornbeam, birch, aspen, and linden are common in mixture with conifers on the better sites. Aspen and birch quickly occupy areas denuded of conifers. The forests suffer considerable losses from late and early frosts, storms, and insects,—timber cut from the State forests (386,000 *ha* in 1904, and 417,000 *ha* in 1912) increased from 4.14 cubic meters per hectare in 1904 to 11.75 cubic meters in 1910, due to ravages of the Nun-moth. In 1912 but 5.01 cubic meters per *ha* was cut, nearly half of it fuelwood. Yields of the larger private forests are about the same as those of state forests; the smaller private holdings are not managed as well, although steps have recently been taken to promote forestry on private holdings.—Before the war, wood exports consisted chiefly of firewood and mine timbers, to western Germany, construction material to Berlin and vicinity, and amounted in all to about 350,000 tons per year. More than 2,200,000 cubic meters of wood were imported from Russia to supply the sawmills and pulpmills in the Memel region. Rapid development of the sawmill industry in Russia has resulted in increased prices of raw material for the Memel mills, and at the same time in lower prices for manufactured lumber.—*W. N. Sparhawk.*

633. von Tubeuf, C. **Schilderungen und Bilder aus nord-amerikanischen Wäldern. [Descriptions and pictures of North American forests.]** Naturw. Zeitschr. Forst- u. Landw. **17**: 153–166. *Pl. 54–59.* 1919.—This article is the second of a series; in it the author describes his trip over the Moffat Road to Idle-wild in the Arapaho National Forest, with reference chiefly to forest types encountered. He gives a brief account of the local organization of the U. S. Forest Service and some of its work. The virgin forests of lodgepole pine, pure or in mixture with alpine fir (*Abies subalpine*, he calls it) are considered in some detail. The system of management is far from intense as compared with German methods, only tie timber is logged, and regeneration is secured naturally, since Lodgepole is a very prolific seeder. A few attempts have been made by the Forest Service to reforest burnt-over areas artificially, where neither lodgepole nor aspen have come in. Aspen and lodgepole usually occupy the land after a fire; the latter most frequently following Douglas fir. The seed extraction establishment on the Arapaho Forest is described. The dendroctonus bark-beetles cause very much damage in this region. Their activities, according to Hopkins, are of a primary nature; not secondary, as the author considers the activities of German bark beetles. Although no direct evidences of insect damage were encountered, the writer was struck with the damage caused by the porcupine (*Erethizon dorsatum*) in lodgepole forests, and gives a description of this animal.—*J. Roeser.*

634. Whitford, H. N. [Rev. of: Brown, W. H., and A. F. Fisher. **Philippine bamboos.** Philippine Islands Bur. Forest. Bul. 15. *32 p., 33 pl.* Manila, 1918.] Jour. Forestry **18**: 167–168. 1920.

635. Whitford, H. N. [Rev. of: Brown, W. H., and A. F. Fisher. **Philippine mangrove forest.** Philippine Islands Bur. Forest. Bull. 17. *132 p., 47 pl.* Manila, 1919.] Jour. Forestry **18:** 166–167. 1920.

636. Whitford, H. N. [Rev. of: Skottsberg, Carl V. **Die Vegetationsverhältnisse längs der Cordillera de los Andes S. von 41° S. Br.: Ein Beitrag zur Kenntnis der Vegetation in Chiloe, West-Patagonien, den Andinen, Patagonien und Feuerland. Botanische Ergebnisse der Schwedischen Expedition nach Patagonien und dem Feuerlande 1907–1909.** (Vegetation of the Andean cordillera south of 41° South Lat., Chile, Patagonia and Tierra del Fuego. Botanical results of the Swedish expedition of 1907–09.) *366 p.* Stockholm, 1916.] Jour. Forestry **18:** 164–165. 1920.

637. Wilson, Ellwood. **The use of aircraft in forestry.** Amer. Forestry **26:** 326–328. *4 fig.* 1920.

638. Wimbush, A. **Big teak in Madras.** Indian Forester **46:** 247–249. *1 pl.* 1920.—An average volume of 317 cubic feet per tree was obtained from 111 teak trees, the maximum yield from one tree being 1,099 cubic feet.—*E. N. Munns.*

639. Wolff, M. H. **Plan of relation of forest regulation to forest communities.** Jour. Forestry **18:** 486–497. 1920.—The Coeur d'Alene National Forest (northwestern United States) can best be handled under a system of volume regulation with a sustained annual yield. With small working circles, the development and maintenance of local logging communities is assured. Dividing the forest into six areas, it is possible to develop the plan equally by pairing off the stands of poorer and relatively inaccessible material with the more accessible and high quality stands. The volume cut up to the present shows an apparent over cutting, but this is due to under-estimates of the stand, very conservative estimates of growth, and cutting in non-marketable blocks. It is expected that the annual yield figures of from seventeen to twenty million feet will vary greatly from year to year depending on transport, seasonal variations, logging fluctuations, and the cut from private lands outside the Forest. By maintaining this cut at a constant, the population depending on the industry will largely be stabilized and the communities assured.—*E. N. Munns.*

640. Wood, Leslie S. **The Mapledurham statistics.** Quart. Jour. Forest. **14:** 49–59. 1920.—Yearly diameter measurements of sample areas in several tracts of beech woodland situated in South Oxfordshire, England, and actual volume measurements of trees felled in these woods, disclose some interesting variations in volume related to the density of the crop. In dense woods, due to increased height growth, the average cubic contents of trees of equal diameters is higher than in woods where the trees are widely spaced. The mean increment for a 7-year period for seven pieces of woodland varied from 1.81 per cent to 5.4 per cent and averaged 2.8 per cent. The increment of 1.81 per cent is for woodland where the trees stood too close and that of 5.4 per cent is for one where did they not stand close enough. The total increment per acre was not as large in either case as would have been secured through more judicious spacing. Trees 20 inches or less in circumference show a mean annual increment of 1.5 per cent as compared to 2.44 per cent for those over 20 inches in circumference. The smaller trees owe their slow growth partly to being suppressed and partly to being old stock and consequently slow growers. These figures favor the compartment system in beech woods, for under that system all the suppressed and slow-growing trees are removed and the best-growing trees are encouraged; the removal of the small trees automatically raises the percentage of growth of the larger trees.—*C. R. Tillotson.*

641. Woodbury, T. D. **California forests and forestry.** Amer. Forestry **26:** 262–267. *8 fig.* 1920.

642. Woolsey, Theodore S., Jr. **Fire protection in Portugal.** Jour. Forestry **18:** 542–543. 1920.—The methods employed by the government, on a forest of 28,066 acres, are described.—*E. M. Munns.*

643. Woolsey, Theodore S., Jr. **Prevention of forest devastation.** Jour. Forestry 18: 326–328. 1920.

644. Woolsey, Theodore S., Jr. [Rev. of: Goblet d'Alviella, Felix. **Elements de sylviculture.** *Vol. 1, 383 p.; Vol. 2, 269 p.* Marcel Reviere: Paris, 1919.] Jour. Forestry 18: 296–297. 1920.

GENETICS

G. H. Shull, *Editor*
J. P. Kelly, *Assistant Editor*

645. Åkerman, Å. **Speltlike bud-sports in common wheat.** Hereditas 1: 116–127 *6 fig.* 1920.

646. Åkerman, Å., Hj. Johansson, and B. Platon. **Fortsatta undersökerningar rörande suckerhalt och torrsubstanshalt hos några höstvetesorter. [Continued examinations on the percentage of sugar and dry-substance in some varieties of winter wheat.]** Sveriges Utsädesf. Tidskr. 28: 216–224. 1918.—Continuation of senior author's work on winter killing and frost resistance. [See Bot. Absts. 5, Entry 254.]—*K. V. Ossian Dahlgren.*

647. Altenburg, Edgar, and Hermann J. Muller. **The genetic basis of truncate wing, —an inconstant and modifiable character in Drosophila.** Genetics 5: 1–59. *1 fig.* Jan., 1920.—Truncate wing is an inconstant character varying from short truncate to normal. It is still modifiable after 100 generations of selection, and even the best truncate lines threw 10 per cent of normals. The variation is both somatic and genetic, and there is a close resemblance to the cases quoted in favor of factorial inconstancy. Yet a detailed analysis shows that the genetic variation is due to sorting out of factors, not to fluctuation of individual genes; since when the genetic constitution was maintained constant in a new type of "pure line" experiment carried out by means of "identifying factors," selection was without effect.—The truncate character is due to several factors, at least one in every chromosome except the fourth. The main factor, without which the character rarely appears, is in the second chromosome. This factor is lethal when homozygous, hence the impossibility of obtaining a pure stock. The low number of normals thrown in selected stocks is due to a "balancing" lethal in the opposite chromosome, which kills off the normals (except those that escape by crossing over). The truncate factor in the third chromosome reduces the fertility of females homozygous for it, thus also preventing the obtaining of pure stock. The first chromosome factor is not lethal and does not reduce the fertility.—The authors point out the applicability of the method of "identifying factors" to other complex genetic cases, as in human heredity.—*Alexander Weinstein.*

648. Anderson, W. S. **Bloodlines of genetic value.** Science 52: 41. July 9, 1920.—Author's abstract of paper read before seventh annual meeting of the Kentucky Academy of Science, Lexington, May 8, 1920:—In the domestic breeds of live stock great sires seldom produce more than one or two sons that are greater progenitors than themselves. This means, in blooded stock, that the greatness of any given blood line is handed on by one or two in any one generation, the others of the generation merely add members. In support of the statement, the great sires of nine breeds of domestic animals were cited and the few sons of each were named who have been instrumental in handing on the breeds.—*W. S. Anderson.*

649. Anonymous. **Death of W. Schallmayer.** Jour. Heredity 11: 155. April, 1920.

650. Anonymous. **Moral qualities and eugenics.** Jour. Heredity 11: 189. April, 1920.

651. Anonymous. **Were the black-and-white Holsteins originally red-and-white?** Jour. Heredity 11: 155. April, 1920.

652. Bateson, W., and Caroline Pellew. **The genetics of "rogues" among culinary peas (Pisum sativum).** Proc. Roy. Soc. London **91**: 186–195. May 12, 1920.—Summarizes data on genetics of "rogues" in peas published in 1914. Gives details of further experiments. Finds: (1) reciprocal crosses between type and rogue give plants which, as they develop, turn into rogues. (2) Though characters of type are introduced and manifest their presence by affecting form of young F_1 plant, they very rarely take part in germ-lineage, being apparently left behind in the lower nodes. (3) Plants really intermediate between type and rogue exist, but never breed even approximately true. Their germ-cells may be either type, intermediate (2 kinds at least), or rogue. Proportion of gametes carrying type-characters is different on male and female sides, the ratio in both sexes showing gradational change.—Egg-cells of lower flowers, up to about 10th flowering node in more than 50 per cent of cases carry type-characters—at least the non-pointed character—above which level, proportion declines. Only about 20 per cent of pollen in lowest two flowers is type-bearing, and above this level, in each successive flower, the proportion of type-bearing pollen rapidly diminishes. Discusses somewhat comparable cases of Biffen with gray chaff character in wheat crosses; of Ikeno with variegated *Capsicum* crossed with green type, with no recovery of former in later generations; of Baur's interpretation of data obtained from crosses between white-skinned and green plants, and of Winge's observations on *Humulus*, where slightly variegated lower leaves, subsequently became green. Of all these, Winge's case is said to be the most comparable. Weak growth on type plants in peas does not specially favor appearance of rogue characters, and rogues even when most luxuriant, do not produce types. No Mendelian system applicable in such cases, but genetic differences in germ plasm undoubtedly exist. No clear discontinuity. Two sorts of intermediate gametes must exist—one more type-like and one more rogue-like. Numerical chromosome differences between rogue and type do not exist, each having seven in haploid cells. Comments on long-held belief of practical breeders and conventional evolutionists that when selection ceases, a breed degenerates. As regards rogue character in peas, this is true, although not true for any other known genetically studied case, so far as the writers know.—*Orland E. White.*

653. Bauer, J. Aufgaben und Methoden der Konstitutionsforschung. [Problems and methods of study of the constitution.] Wiener klin. Wochenschr. 1919.

654. Baur, E. Einführung in die experimentelle Vererbungslehre. [Introduction to genetics.] *3rd & 4th ed., 410 p., 10 colored pl., 142 fig.* Gebrüder Borntträger: Berlin, 1919.

655. Bergman, Emanuel. **A family with hereditary (genotypical) tremor.** Hereditas **1**: 98-106. *2 fig.* 1920.

656. Čamek, Josef. Investigations of the hair of different breeds of cattle. Jour. Agric. Sci. **10**: 12–21. Jan., 1920.—Investigations of hair of different European breeds of cattle showed that in pure-bred animals maximum length of hair is found between the ages of 6 months and 2 years, and that older animals have shorter hair. The hair of bulls is always longer than that of cows and oxen of the same age. The white hair of an animal is shorter than the colored. The diameter of the hairs is less for cattle up to 3 months and the greatest diameter is reached by animals between 1 and 2 years of age. Males have hair of greater diameter than do females. The white hair of an animal is of less diameter than colored. In general, diameter increases with length. In short hair the diameter is relatively greater than in long ones. With bulls the ratio of diameter to length is smaller than in cows and heifers of the same age. The ratio is greater in white hair. Food is without influence on diameter. —Ash content of hair depends on pigmentation, age, sex, and possibly food. Colored hair contains more ash than white and also more iron. Ash is also greater in black than in brown or red hair.—*Elmer Roberts.*

657. Chodat, R. **La panachure et les chimères dans le genre Funkia.** [Variegation and chimeras in the genus Funkia.] Compt. Rend. Soc. Phys. Hist. Nat. Genève **36**: 81-84. 1919.

658. Cook, O. F. **Cotton a community crop.** Jour. Heredity **11**: 174–177. April, 1920

659. Correns, C. **Die geschlechtliche Tendenz der Keimzellen gemischtgeschlechtige Pflanzen.** [Sex tendency of germ-cells in plants of mixed sex.] Zeitschr. Bot. **12**: 49–60. *fig.* 1920.

660. Coulter, J. M. **Mutation.** [Rev. of: Constantin, J. **La mutation. État actue de la question.** (**Mutation. Present status of the question.**) Ann. Sci. Nat. Bot. X. 1. iii–xxix. 1919. (See Bot. Absts. 4, Entry 552.)] Bot. Gaz. **69**: 535. June, 1920.

661. Coulter, M. C. [Rev. of: East, Edward M., and Donald F. Jones. **Inbreeding and outbreeding.** *14 × 21 cm. 285 p., 46 fig.* J. B. Lippincott, Philadelphia, 1919. (See Bot. Absts. 4, Entry 571.)] Bot. Gaz. **69**: 530–532. June, 1920.

662. Cowgill, H. B. **Report on tomato and melon breeding.** Ann. Rept. Insular Exp. Sta. Porto Rico **1917–18**: 96–98. 1919.—Tomato hybrids: Original cross was between vigorous local Cherry tomato and Livingston Globe; purpose to secure disease-resistant tomato of good quality suitable to conditions of Porto Rico. F_1 plants were intermediate in many prominent characters. In F_2 318 plants were grown, many closely resembling one or other of parents, majority more like Cherry parent. These were in general strong growers and resistant to unfavorable conditions. Partial inverse correlation was noticed between number of fruits in inflorescence and size of fruits; large majority of fruits were shorter in polar diameter than equatorial, which is not true of either parent. Size is at least partially independent of number of cells. No plants had all fruits two-celled like Cherry parent, though some had majority two-celled. Many plants were very promising as to vigor of growth, prolificacy and disease-resistance.—Melon hybrids: F_1 of crosses between local oblong melon with soft rind (pistillate parent) with Hybrid Casaba and Honeydew (staminate). Both of latter have hard rind and are susceptible to downy mildew, though female parent is resistant. Hybrid offspring appeared very resistant, and flavor of fruit was good. Hybrids were more precocious and prolific than local melon. Where Casaba was used as male parent offspring were pyriform and grooved and rough-skinned; when Honeydew was pollen parent hybrid fruits were smooth-skinned, oval and faintly grooved or without grooves.—*E. E. Barker.*

663. Cowgill, H. B. **Report of the division of agronomy and plant breeding.** Ann. Rept. Insular Exp. Sta. Porto Rico **1917–1918**: 78–95, 98–104. 1918.—Work with seedling sugar canes was continued to secure several types necessary for different ecological areas of Porto Rico. Several promising new seedling varieties were selected after 3 or 4 years trial. Studies were made of distinguishing botanical characters of cane varieties. 37 crosses were attempted, 15 with success, yielding 1794 seedlings. Otaheite and Crystallina were used as seed parents and B-4596, B-347, B-3412, D-117, D-109, and P. R.-207 as pollinators. Viability of nearly all varieties, either crossed or open-pollinated, was relatively low; 45 flats planted with open-pollinated seeds of 6 varieties yielded 5200 seedlings. Describes 6 varieties produced by cross-pollination in 1916. From 1917 seedlings 36 selections were made, 12 from 1914, or 35.5 per cent of that year's seedlings and 4 or 26.6 per cent of 1913 seedlings were selected. These were all planted in $\frac{1}{10}$ acre plots for comparison with Crystallina. They are now ready to be tested in other parts of Porto Rico. Descriptions of 10 are given. 1912 seedlings were nearly all retained for trial; tables of their yield and analysis are given. Foreign varieties tested for disease resistance on infested soils found all to be susceptible, though some showed varying degrees of resistance. 1500 seedling canes in pots sent to Centrale Coloso and planted in disease infested field, became so badly infected with mottling disease that all were plowed up.—*E. E. Barker.*

664. Darrow, Geo. M. **Are our raspberries derived from American or European species?** Jour. Heredity **11**: 179–184. *4 fig.* April, 1920.

665. de Vries, E. **Versuche über die Frucht- und Samenbildung bei Artkreuzungen in der Gattung Primula.** [Study on fruit and seed formation in species crosses of the genus Primula.] Recueil Trav. Bot. Néerland. 16: 63–203. 1919.—See Bot. Absts. 6, Entry 739.

666. Dufour, L. [Rev. of: Daniel, L. **Les symbiomorphoses; nouvelles recherches sur l'hybridation asexuelle.** (The symbiomorphoses; recent investigations on asexual hybridization.) Revue bretonne de Botanique pure et appliquée, 1917.] Rev. Gén. Bot. [Paris] 30: 367–368. 1918.—The term "symbiomorphosis" is applied to the diverse modifications of plants verified as the result of grafting. Two cases are distinguished according as the grafts are between different species or upon hybrids.—(1) Grafts between different species of cacti, vines and conifers are mentioned with the peculiar modifications produced. The cabbage when grafted on the tomato exhibited two tomato characters viz., an internal medullary liver and extremely thin crystals of calcium oxalate in the cells. (2) Under symbiomorphoses among hybrids three kinds of effects are described in specific instances viz., returning to the parental types (pears, vines); attenuation or reinforcement of characters (vines); occasional reappearance of ancestral characters (vines). Author's conclusion: "in the same graft one may encounter variations of diverse origin which are blended together or which encroach upon one another. In general, symbiomorphoses are almost always a resultant complex (globale) of numerous physical, chemical and physiological factors."—*E. B. Babcock.*

667. East, E. M. **Hybridization and evolution.** Amer. Nat. 54: 262–264. May–June, 1920.—The two species, *Nicotiana rustica* and *N. paniculata*, fall into distinctly different groups of the genus, yet partially fertile hybrids have been obtained by crossing them, the F_1 generation being intermediate and as uniform as either parent. Few of the gametes are viable, yet the F_2 generation is inordinately variable, which indicates that the two species differ in an extremely large number of inherited factors. The factors for normal fertility recombine in the Mendelian sense just as do the factors for other characters, so that highly fertile strains can be selected some of which are more unlike than the two original species. *Eight of these strains were crossed in all possible combinations and every F_1 generation exhibited as high a degree of fertility as that shown by the parents.*—Lotsy's theory of evolution through hybridization, founded on the study of crosses in *Nicotiana, Pisum, Petunia* and *Antirrhinum*, which gave results comparable with the above, was based on assumptions which are open to numerous criticisms. Yet hybridization has played some part in evolution and it is important to determine the limits of its rôle. Author's observations suggested to him that the F_2 generations arising from partially sterile F_1 interspecific hybrids might furnish much of the variability required for evolution under domestication, the chief cause of which is shown by both historical and experimental evidence to be hybridization of species. But evolution under domestication must not be confused with natural evolution. The perfect fertility within groups of domestic animals and cultivated plants stands in contrast to the marked sterility between the great majority of natural species. Author's evidence and observations on domestic forms yield no indication of a tendency toward production of segregates that exhibit either incompatibility in crosses or sterility of hybrid offspring.—*E. B. Babcock.*

668. Eriksson, J. **Platanthera bifolia × montana i Blekinge.** [**Platanthera bifolia × montana in Blekinge** (Sweden).] Bot. Notiser 1918: 59–62. 1918.—At some few places in Blekinge this hybrid has been found. Its appearance and occurrence are given. The flowers are, as in *Platanthera montana*, scarcely nice smelling. The fruits nearly always fail to develop.—*K. V. Ossian Dahlgren.*

669. Federley, H. **Ärftlighetsforskningens resultat tillämpade på manniskan.** [**Results of genetical science applied to mankind.**] Studentföreningens Verdandls Småskrifter no. 218. *47 p., 22 fig.* A. Bonnier: Stockholm, 1918.—A lecture read at a meeting of the Swedish Eugenical Society. The following matters are treated: The biometrical school, Mendelism, Mendelian characters of man, the cytological basis of heredity, sex and the chromosomes, the sex-limited type of heredity, and the social importance of genetical science.—*K. V. Ossian Dahlgren.*

670. Fruwirth, C. **Handbuch der landwirtschaftlichen Pflanzenzüchtung. 3. Die Züchtung von Kartoffel, Erdbirne, Lein, Hanf, Tobak, Hopfen, Buchweizen, Hülsenfruchtern und kleeartigen Futterpflanzen.** [Handbook of agricultural plant breeding. 3. The breeding of potatoes, Jerusalem artichokes, flax, hemp, tobacco, hops, buckwheat, legumes and clover-like forage plants.] *3rd ed., 240 p., 45 fig.* Paul Parey: Berlin, 1919.—See also Bot. Absts. 6, Entry 725.

671. Galant, S. **Über die Entstehung von Variationen bei Anemone hepatica.** [Origin of variations in Anemone hepatica.] Biolog. Zentrabl. 39: 529–535. Dec., 1919.

672. Gillies, C. D. **Variation of sepals of Bruguiera Rheedii Blume.** Proc. Roy. Soc. Queensland, 30: 95–96. 1918. [Issued Dec. 21, 1918.]

673. Goldschmidt, Richard. **Die quantitative grundlage von Vererbung und Artbildung.** [The quantitative basis of heredity and species formation.] *163 p., 28 fig.* Julius Springer: Berlin, 1920.

674. Hadley, Philip, and Dorothy W. Caldwell. **Studies on the inheritance of egg-weight. I. Normal distribution of egg-weight.** Rhode Island Agric. Exp. Sta. Bull. 181. *64 p., 43 fig.* Jan., 1920.—An unselected, homogeneous group of 39 White Plymouth Rock pullets was the original stock, to which no new blood was added. These were subsequently divided into a large-egg, and small-egg group. Individual hens showed a marked conservation in the weight of their eggs. The first eggs in a laying year were smaller than those which followed, a maximum being reached in April, a minimum in July or August, a second maximum in September and a second minimum in November or December. In and after the fourth laying year the mean egg-weight continued to decrease during the eight years. The results were inconclusive regarding the relation between body-weight and egg-weight. No correlation was shown between body-weight and total egg-weight. There was a tendency for hens possessing higher mean egg-weights and heavier "maximum" eggs to produce a first egg of greater weight.—*B. L. Hartwell.*

675. Hagiwara, Tokio. **On the coupling of two leaf characters in the Japanese morning glory.** Bot. Mag. Tokyo 34: 17–18. *3 tables.* Mar., 1920.—Describes crosses between a race with variegated up-rolled leaves with two others with flat green leaves. Variegation and rolling are due to recessive factors but show a certain degree of coupling. Taken separately each gives a very close approximation to a 3:1 ratio but considered together the numbers were as follows: —252 flat green : 26 rolled green : 27 flat variegated : 69 rolled variegated, where the expectation on the basis of complete independence would have been for a 9:3:3:1 ratio. The numbers actually found are thought by the author to accord well with the assumption of a gametic gatio of 7:1:1:7 (after Bateson and Punnet's hypothesis), which would theoretically yield 258.4 flat green: 21.7 rolled green: 21.7 flat variegated: 70.4 rolled variegated. Crossover percentages are not calculated or in fact considered.—*Leonas L. Burlingame.*

676. Harland, S. C. **Studies of inheritance in cotton. I. The inheritance of corolla colour.** West Indian Bull. 18: 13–19. 1920.

677. Harrison, J. W. Heslop. **Genetical studies in the moths of the geometrid genus Oporabia (Oporinia) with a special consideration of melanism in the Lepidoptera.** Jour. Genetics 9: 195–280. *13 fig.* Feb., 1920.—The heath-feeding geometrid subspecies *Oporabia filigrammaria* (37 pairs of chromosomes) was derived from *O. autumnata* (38 pairs of chromosomes) of birch, alder, larch or pine. "This event was caused during the Glacial period by the action, direct and indirect of changed climatic conditions." Eggs of the heather insect hatch much earlier in the spring and imagines appear a month earlier; its larvæ may be raised on the food plants of the other species, but are never found upon moorland birch, alder, larch. The preference for heather is due to "long years of compulsory oviposition on these plants" that "have so affected the organism that the habit has been impressed germinally." Raised on

birch and alder and inbred for 5 seasons, *filigrammaria* showed no characters of the birch-alder-larch-eating *autumnata*.

A local larch-pine race of *autumnata* has developed in Wilton Wood, Yorkshire, since moorland reforestation about 1800; a neighboring isolated larch forest (Normanby Intake) was destroyed in 1885 and birches came in. Larch-feeding insect of Wilton is smaller, duller, feebly marked, a month earlier than the more typical birch-feeding Normanby form. But the birch instinct has not been lost in the Wilton variety. Birch feeding restores original size, though natural selection by bats, owls and night-jars has tended to eliminate pale, silvery variants in favor of darker and feebly-marked. Earlier emergence of larchwood race is due to gradual fall of temperature under extremely cool moist conditions of the dense larch forest in contrast with dryer, more open birch woods. In evidence, pupæ exposed to a gradual fall in *low* temperatures emerged earlier than others exposed to a similar fall at higher temperatures. Caterpillars of larchwood stock fed on birch produced imagines indistinguishable from their own race in color and early time of emergence (1), but of larger size.

A local brilliant silvery variety of *O. dilutata* is found in an isolated oak wood cut off by a ridge 1000 feet high from the nearest oaks, ¾ mile distant, where "the ordinary suffused melanic form" occurs.—The increasing prevalence of melanism of moths near English industrial centers is ascribed to "changed metabolism favoring resistance to, or actually induced by, the use of food contaminated with metallic salts and other compounds. Exhaustive daylight observations on *Polia chi* showed that no natural selection favorable either to dark or light forms occurred, although natural selection is not entirely ruled out.—Melanism in *Oporabia* is non-Mendelian. A persistent blend occurs.—A ♀ mutation of *autumnata*, "*latifasciata*," with barred wings, behaves as a sex-linked (partial) dominant, heterozygous for sex. Crossed with recessive type ♂, a sex criss-cross results (♂♂ heterozygous, *latifasciata*; ♀♀ recessive type). Heterozygous dominant F_1 ♂ (Z′Z, using Morgan's symbols, Z′ being chromosome carrying *latifasciata* gene) mated with the recessive type ♀ (WZ), either of F_1 or of wild stock, gave heterozygotes and recessives of each sex in equal numbers (*latifasciata* ♀♀ and ♂♂ + type ♀♀ and ♂♂, i.e., $WZ' + Z'Z + WZ + ZZ$). Recessive F_1 type ♀ mated with type ♂ bred true.—Crosses between *O. autumnata* and *dilutata* are probably sex-linked, though it is suggested that, since the latter has only 30 pairs of chromosomes instead of 38, "mitotic anomalies" may explain the phenomena. Great disturbances in development occurred: (1) ♀♀ from *autumnata* ♀ × *dilutata* ♂ emerged three months before the males and had no ovaries, (2) *dilutata* ♀ × *autumnata* ♂ produced few females, never more than one per brood, but fertile and like *autumnata*. Lack of viability is manifest in pupæ. Though both reciprocal F_1 hybrid ♂♂ are fertile, back-crossing never produced adults. No synapsis, nor reduction division, occurs. A larva with wings appeared in F_1 ex *autumnata* ♀ × *dilutata* ♂. Bacterial disease delays gametogenesis and hence emergence, but precocious ovariless ♀♀ of *O. autumnata* ♀ × *dilutata* ♂, though infected, appeared at their accustomed time. —Hybrids between *autumnata* and *filigrammaria* are a blend, no segregation appearing in F_2 nor in back-crosses, but in F_3 "a delayed or pseudo-segregation is manifested in which a portion of the brood still remains intermediate whilst the remainder appeared in a uniform pseudo-mutational guise," recalling behavior of *Oenothera Lamarckiana*. No segregation of marked size-differences of parents in support of multiple factor theory. A female with three antennæ appeared in intermediate portion of F_3 lot. Back-crossing F_1 (blend) with *autumnata* produced in first generation *autumnata*, but in back-crossing with *filigrammaria* two generations are necessary to bring hybrids back to pure *filigrammaria* facies. Reduction division of F_1 *filigrammaria* ♀ × *autumnata* ♂, involving 37 × 38 chromosomes (haploid numbers) is nearly perfect. Crosses between *filigrammaria* and *dilutata* failed, apparently through lack of physiological affinity. Ova from *Cheimatobia boreata* ♀ × *O. autumnata* ♂ failed to hatch. No ova from reciprocal cross, nor from *C. brumata* × *O. autumnata*.—*John H. Gerould.*

678. Heal, John. **Streptocarpus hybrids.** Gard. Chron. 67: 293. June 12, 1920.—Breeding of *Streptocarpus* is modern, but many advances have been made in late years. Greenhouse races originated from Kew hybrids. First flowers were comparatively small, on short

stems with few colors and foliage long and ungainly. Continued selection and crossing brought compact habit, shorter foliage, shades of color ranging from white through rose, pink to salmon, red, violet and blue, also yellow, remarkable floriferousness, long succession of bloom, lasting quality of flowers and numerous handsome habit types. Many species have been used in hybridization work. Names given. Flowers of some varieties reach 4.5 inches and have long stems. Color races are fixed and breed true. Detailed description of culture is given. Seedlings flower in seven months.—*Orland E. White.*

679. Heribert-Nilsson, N. **Zuwachsgeschwindigkeit der pollenschläuche und gestörte Mendelzahlen bei Oenothera Lamarckiana. [Decline in pollen-tube growth and deranged Mendelian ratios in Oenothera Lamarckiana.]** Hereditas 1: 41–67. *1 fig.* 1920.

680. Hertwig, Paula. **Haploide und diploide Parthogenese. [Haploid and diploid parthenogenesis.]** Biol. Zentralbl. 40: 145–174. April–May, 1920.

681. Honing, J. A. **Selection studies with Deli tobacco.** Teysmannia 30: 1–11. *2 pl.* 1919.

682. Hooper, J. J. **A study of inheritance of coat colors in Jersey cattle.** Science 52: 43. July 9, 1920.—Author's abstract of paper read before Seventh Annual Meeting, Kentucky Academy of Science, Lexington, May 8, 1920: Studies of inheritance of Jersey cattle coat colors by the author show that white spots are recessive to dominant solid color, and a white tongue and tail-switch also are recessive. Colors of 1145 calves were tabulated and compared with those of their 2290 sires and dams. Some bulls studied seemed to be pure dominants, as their calves were all solid in color, although as many as a hundred were sired by each bull. It was found that 66 per cent of Jersey cattle are solid in color and have black tongue and switch, while 12 per cent are broken and have white tongue and switch; 3.6 per cent are solid and have white tongue and black switch, etc.—*J. J. Hooper.*

683. Hume, A. N. **A system for breeding corn or gregarious animals.** Jour. Heredity 11: 191-192. April, 1920.

684. Ikeno, S. **Études d'hérédité sur la réversion d'une race de Plantago major. [Genetical studies on reversion in a race of Plantago major.]** Rev. Gén. Bot. 32: 49–56. 1920.—Author reports on variety of *P. major* called *contracta* with leaves rounder, smaller and thicker, and spikes much shorter than in typical *P. major*. Crossings of *contracta* and the type led to an F_2 of 2525 typical : 826 *contracta*. Inbred *contracta* gave 3 per cent of plants like typical *P. major*; these reversions proved heterozygous and gave 3 typical to 1 *contracta* on selfing. Author discusses possible place or time at which the reversionary mutation in *contracta* gene occurred.—*James P. Kelly.*

685. Jones, D. F. **Heritable characters of maize. IV. A lethal factor—defective seeds.** Jour. Heredity 11: 161–167. *7 fig.* April, 1920.

686. Jost. [German rev. of: Lehmann, Ernst. **Über die Selbststerilität von Veronica syriaca. (On the self sterility of Veronica syriaca.)** Zeitschr. indukt. Abstamm. Vererb. 21: 1–47. *1 fig.* May, 1919. (See Bot. Absts. 3, Entry 2159.)] Zeitschr. Bot. 12: 87. 1920.—See also Bot. Absts. 6, Entry 695.

687. Kappert, H. **Über das Vorkommen vollkommener Dominanz bei einem quantitativen Merkmal. [The occurrence of complete dominance in a quantitative character.]** Zeitschr. indukt. Abstamm. Vererb. 22: 199–209. *1 fig.* Mar., 1920.—In two varietal crosses of peas—Laxtons Vorbote × William Hurst and Mammuterbse × William Hurst—the author found no significant difference between homozygous tall and heterozygous tall plants with respect to the following characters: total height of plant, average length of internodes, and number of internodes. Data are presented on a small F_2 and F_3 population for one cross and on a somewhat larger F_2, F_3, and F_4 population for the other.—*R. J. Garber.*

688. Koch, L. Uitkomsten van eenige selectienproeven met padi. [Results with some selection experiments with rice.] Korte Ber. uitgaande van den Landbouwvoorlichtingsdienst van het Departement van Landbouw, Nijverheid en Handel. Selectie—en Zaadtuin te Buitenzorg. No. 21. *16 p.* July, 1919.—In the last series of trials made in 1916-1919, pure strains were in 4 cases compared with the original population and with mixtures of pure strains. In 6 out of 10 trials the strains yielded more than the population. In 8 out of 10 trials the mixture of pure strains yielded more than the population. In 7 out of 10 trials the mixture of pure strains yielded more than the pure strains planted singly.—All trials combined the conclusion is reached, that pure strains may in some cases yield more than the population but almost always in later years the former fails in superiority to the latter. Pure-line breeding is unsatisfactory under such variable conditions as found in Java for the annual crops here considered.—*L. Koch.*

689. Kooiman, H. N. Eenige opmerkingen naar aanleiding van Lotsy's artikel, "De Oenotheren als kernchimeren." [Remarks on the introduction of Lotsy's article "The Oenotheras as nuclear chimeras."] Genetica 2: 235–243. May, 1920.—See Bot. Absts. 6, Entry 1092.

690. Kooiman, H. N. [Dutch rev. of: Collins, E. J. Sex segregation in the Bryophyta. Jour. Genetics 8: 139–146. *Pl. 6, 5 fig.* June, 1919. (See Bot. Absts. 3, Entry 2103.)] Genetica 2: 253. May, 1920.

691. Kooiman, H. N. [Dutch rev. of: Fruwirth, C. Die Umzüchtung von Wintergetreide in Sommergetreide. (The breeding of winter cereals into spring cereals.] Zeitschr. Pflanzenzücht. 6: 1–46. Mar., 1918. (See Bot. Absts. 1, Entry 1204; 2, Entry 935.)] Genetica 2: 255. May, 1920.

692. Kooiman, H. N. [Dutch rev. of: Harland, S. C. Inheritance of certain characters in the cowpea (Vigna sinensis). Jour. Genetics 8: 101–132. *1 fig.* April, 1919. (See Bot. Absts. 3, Entry 1003.)] Genetica 2: 259–260. May, 1920.

693. Kooiman, H. N. [Dutch rev. of: von Tschermak, E. Bastardierungsversuche mit der grünsamigen Chevrier Bohne. (Hybridization studies with the green-seeded Chevrier bean.) Zeitschr. Pflanzenzücht. 7: 57–61. June, 1919.] Genetica 2: 277–278. May, 1920.

694. Krause, K. [German rev. of: Bally, Walter. Die Godronschen Bastarde Zwischen Aegilops- und Triticumarten. Vererbung und Zytologie. (The Godronian hybrids between species of Aegilops and Triticum. Heredity and cytology.) Zeitschr. indukt. Abstamm. Vererb. 20: 177–240. *4 fig.* Feb., 1919.] Bot. Jahrb. 56: 5–6. 1920.

695. Krause, K. [German rev. of: Lehmann, Ernst. Über die Selbststerilität von Veronica syriaca. (On the self sterility of Veronica syriaca.) Zeitschr. indukt. Abstamm. Vererb. 21: 1–47. *1 fig.* May, 1919. See Bot. Absts. 3, Entry 2159.] Bot. Jahrb. 56: 6. 1920. See also Bot. Absts. 6, Entry 686.

696. Laughlin, Harry H. Illustrating the structure and mathematics of the human germplasm. Jour. Heredity 11: 185–189. *1 fig.* April, 1920.

697. Lehmann, Ernst. Neure Oenotherenarbeiten. (Sammelreferat II.) [New work with Oenothera. (Composite review II.)] Zeitschr. Bot. 12: 61–85. *14 fig.* 1920.

698. Lehmann, E. [German rev. of: Correns, C. Die Absterbeordnung der beiden Geschlechter einer getrenntgeschlechtigen Doldenpflanze. (Trinia glauca) (Order of death of the two sexes in a dioecious umbelwort (Trinia glauca).) Biol. Zentralbl. 39: 105–122. *3 fig.* Mar., 1919. (See Bot. Absts. 3, Entry 2105.)] Zeitschr. Bot. 12: 86. 1920.

699. Lehmann, E. [German rev. of: von Ubisch, G. **II. Beitrag zu einer Faktorenanalyse von Gerste.** (Second contribution to a factorial analysis of barley.) Zeitschr. indukt. Abstamm. Vererb. **20**: 65–117. *7 fig. 11 diagrams.* Jan., 1919.] Zeitschr. Bot. **12**: 171–172. 1920

700. Levine, C. O. **Native horses and cattle in the Orient.** Jour. Heredity **11**: 147–155. *Frontispiece, 4 fig.* April, 1920.

701. Ljung, E. W. **Svalöfs förädlade Vasaråg.** [Svalöfs improved Vasa-rye.] Sveriges Utsädesf. Tidskr. **28**: 71–81. 1918.—Describes a new rye variety obtained in Sweden by selection from Common Vasa-rye.—*K. V. Ossian Dahlgren.*

702. Lotsy, J. P. **Oenothera-proeven in 1919.** [Oenothera experiments in 1919.] Genetica **2**: 200–213. *5 fig.* May, 1920.

703. Lotsy, J. P. **Theoretische steun voor de Kruisings-theorie.** [Theoretical basis for the theory of the origin of species through hybridization.] Genetica **2**: 214–234. May, 1920.

704. Lotsy, J. P. [Dutch rev. of: de Lint, G. M. **Over de verspreiding van Eurytemora affinis Poppe en Eurytemora hirundoides Nordquist in Nederland.** (Distribution of Eurytemora affinis Poppe und Eurytemora hirundoides in Netherlands.) Mededeel. Wetenschap. Vergader. Nederl. Dierk. Ver. 1919.] Genetica **2**: 264–266. May, 1920.

705. Lotsy, J. P. [Dutch rev. of: Semon, Richard. **Über das Schlagwort "Lamarckismus."** (On the catch-word "Lamarckism.") Zeitschr. indukt. Abstamm. Vererb. **22**: 51–52. Dec., 1919.] Genetica **2**: 269–271. May, 1920.

706. Lotsy, J. P. [Dutch rev. of: von Tschermak, E. **Beobachtungen über anscheinende vegetative Spaltungen an Bastarden und über anscheinende Spätspaltungen von Bastardnachkommen, speziell Auftreten von Pigmentierungen an sonst pigmentlosen Deszendenten.** (Observations on apparent vegetative splitting in hybrids, and on apparently belated splitting in hybrid offspring, especially the occurrence of pigmentation on otherwise pigmentless descendants.) Zeitschr. indukt. Abstamm. Vererb. **21**: 216–232. *1 fig.* Nov., 1920.] Genetica **2**: 278–284. May, 1920.

707. Lundborg, H. **Hereditary transmission of genotypical deaf-mutism.** Hereditas **1**: 35–40. 1920.

708. MacDowell, Edwin Carleton. **Bristle inheritance in Drosophila. III. Correlation.** Jour. Exp. Zoöl. **30**: 419–460. *8 fig.* May 20, 1920.—Author analyses the data presented in two earlier papers by means of the correlation table. He also studied four more unselected generations of same strain. The former data consisted of 49 generations of selection for high bristle number in a strain of *Drosophila melanogaster*. His former conclusions were as follows: (1) Extra bristles behaves as a simple Mendelian character when crossed to the wild. (2) Selection was effective for a few generations and then ceased. (3) Selection was effective because genetic differences existed among the germ-cells of the original extra-bristled flies. (4) Selection ceased to be effective when the strain became homozygous. (5) There was no evidence of germinal changes during selection. (6) The character was dependent to a large extent upon the food.—By means of the correlation table he finds that the generations can be divided roughly into three groups: 1, generations 2 to 10; 2, generations 11–34; 3, generations 35 to 49. In the first group the correlation coefficients are generally significant and positive; in the second group they fluctuate, some being negative; in the third group the only significant coefficients are negative. The author believes the fluctuations in the second group due to non-genetic causes. It is only in the first group that he gets unquestionable positive correlation. It was during this period that the means indicated that selection was effective. Hence by the present method of analysis the author is forced to the same conclusions as in

his earlier papers.—The analysis of the four unselected generations at the end of the selected line showed that high and low grade parents gave rise to the same grade of offspring. Hence the strain was homozygous.—*F. Payne.*

709. Muller, H. J., and E. Altenburg. **The rate of change of hereditary factors in Drosophila.** Proc. Soc. Exp. Biol. Med. 17: 10-14. 1919.—Rate of mutation in *Drosophila melanogaster* was determined by observing rate of occurrence of sex-linked lethals, because lethal mutations are much more frequent than non-lethals. (In the present experiment, in which 33 lethals—of which 4 or 5 were semi-lethals—were observed, no non-lethal mutations were noticed.)—Sex-linked lethals were found to occur in 5 out of 445 females (1 in 90) at 66°F., and in 13 out of 517 females (1 in 40) at 80°F. The value for Q_{10} for mutation is, on this basis, between 2 and 3, as is usual for chemical reactions. The average rate of mutation was 1 in 53. This would mean that one fly in every 13 should contain a lethal mutation in some chromosome or other. A new lethal should occur in each X chromosome once in every 100 generations (4 years), and each individual factor should mutate on the average not oftener than once in 2000 years.—*Alexander Weinstein.*

710. Nienburg. [German rev. of: (1) Bensaude, Mathilde. **Recherches sur le cycle évolutif et la sexualité chez les Basidiomycètes.** (Researches on the evolutive cycle and sexuality in the Basidiomycetes.) *156 p., pl. 1-3, 30 fig.* (Dissertation.) Nemours, 1918. (2) Kniep, Hans. **Über morphologische und physiologische Geschlechtsdifferenzierung.** (Untersuchungen an Basidiomyzeten.) **On the morphological and physiological sex differentiation.** (Studies on Basidiomycetes.) Verhandl. Physik.-med. Ges. Würzburg. *18 p.* 1919.] Zeitschr. Bot. 12: 173–175. 1920.

711. Nilsson-Ehle, H. **Über resistenz gegen Heterodera Schachti bei gewissen gerstensorten, ihre Vererbungsweise und Bedeutung für die Praxis.** [**On resistance to Heterodera Schachti in certain varieties of barley, its method of inheritance and significance for agricultural practice.**] Hereditas 1: 1–34. *4 fig.* 1920.

712. Pearl, Raymond. **A contribution of genetics to the practical breeding of dairy cattle.** Proc. Nation. Acad. Sci. [U. S.] 6: 225–233. *1 fig.* April, 1920.—This paper presents a brief résumé of the conclusion drawn from the study of Jersey registry-of-merit sires relative to what these sires did in transmitting milk yield, butter-fat percentage and butter-fat to their offspring. The measure of this performance is daughter's production minus dam's production equals the genetic worth of the sire for transmitting milk yield, etc., to his offspring.—Transmitting power of 224 sires for butter-fat are presented in this paper. The reader is referred to the complete paper from the Maine Station for the other detailed results.—Certain of the conclusions are: (1) There are 224 Jersey registry-of-merit sires which meet the requirements of this performance test for their transmitting qualities in milk production. One hundred and five of these sires, or less than one-half, raise the milk production of their daughters over that of the dams of these daughters. The largest number of daughter-dam pairs is 39 for the sire Hood Farm Pogis 9th, 55552. Of those sires which have a large number of pairs, Hood Farm Torono 60326 with 34 pairs stands first in his transmitting qualities raising the milk production of his daughters on the average 2620.1 pounds.—(2) Two hundred and twenty-five sires are included in the table giving the sires which met the requirements of the daughter-dam performance test for transmitting qualities of butter-fat percentage. Out of this number 101 sires raised the butter-fat percentage of their daughters' milk as compared with the butter-fat percentage of the dams of these daughters. The leading sire in this butter-fat percentage performance test was Clear Brook Chief 74685 raising his daughters on the average 1.338 per cent of butter fat. This sire had two daughter-dam pairs. Hood Farm Pogis 9th leads in number of daughter-dam pairs with 42. This bull raised the butter-fat percentage of his daughters on the average of 0.243 per cent over the butter-fat percentage of the dams of their daughters.—(3) The sires mentioned as superior in the milk-transmitting ability, Hood Farm Torono and Spermfield Owl, do not check up so well in their ability to transmit high butter-fat percentage. Hood Farm Torono caused his daughters on the average to be 0.225 per cent

of butter-fat below what the dams of these daughters produced. Spermfield Owl only raised his daughters on the average 0.027 per cent of butter fat over what the dams of these daughters produced.—(4) There are 224 sires of known transmitting ability for net butter fat. Of this number only 99 sires raise the butter-fat production of their daughters over that of their dams. The sires which raised the production of their daughters' butter fat most were Sans Aloi 81012, Signal's Successor 72758, and Golden Glow's Chief 61460. The sires which made the deepest impress on the breed by raising the butter fat of the largest number of daughters over that of their dams was Hood Farm Torono with 34 pairs and an average increase for each daughter of 121.51 pounds of butter fat. The next bull, Spermfield Owl, with 26 pairs raised the butter-fat production 97.71 pounds on the average for each of his daughters. Some of the bulls lowering the production of their daughters markedly were Gertie's Son of Washington 83799, Hood Farm S. Tormentor 96311, and Oxford Lad's Owl 75599.—(5) The information summarized above was arranged to reveal the transmitting qualities for milk production, butter-fat percentage and butter fat of Jersey sires to their sons. There were 159 sires which had sons whose progeny performance was known. Of this number 69 or significantly less than half had sons who raised the butter-fat production of their daughters over that of their dams. —(6) The sires of superior merit are defined as those which raise the milk production and butter-fat percentage of their daughters as compared with that of their dams. The inferior sires are defined as those sires who lower the milk production and butter-fat percentage of their daughters as compared with the same variables in their dams. The superior sires so defined were arranged by the amount of butter fat that they increase the production of their daughters over that of their dams. The inferior sires were classified according to the amount of butter fat that they decrease the production of their daughters in comparison with that of their dams. These two groups of sires are subjected to four generations of pedigree analysis to determine their inbreeding and relationship, the amount of Island and American stock, "males and females" and "on the sire's side of the pedigree and on the dam's side of the pedigree," and the individual animals most frequently repeated into two groups of pedigrees.—(7) There are 28 sires in the group of sires superior in their transmitting qualities for milk production and butter-fat percentage. In the group of sires inferior in their transmitting ability for these two characters there are 47 sires, a ratio of 1 to 1.7 Such a difference speaks for itself. It emphasizes with startling clearness the need of exact knowledge of the transmitting qualities of bulls to be bred as sires and of the necessity for exact knowledge of the inheritance of milk production and butter-fat percentage.—(8) The inbreeding coefficients show that the sires of superior merit have 7.08 per cent of the greatest possible inbreeding up to the fifth generation. The inferior sires are inbred 9.65 per cent of the greatest possible amount (continued brother and sister mating). The group of sires poorer in their transmitting qualities are consequently more inbred than the group of sires with superior transmitting qualities.—(9) The analysis of the pedigrees for the amount of relationship that may exist between the sire and dam of the individual bulls in the superior group and in the inferior group shows that there is little or no difference in the amount of this relationship within the two groups.—(10) The resolution of the four generation pedigrees into the Island-bred Jerseys and by difference into the American-bred Jerseys showed the mean number of Island males in the pedigrees of the superior sires' group to be 8.07 and the mean number of females 7.79. The mean number of Island-bred males in the inferior sires' group were shown to be 6.94. and the mean number of females 6.55. The group of sires which increased the production of their daughters over that of their dams had, consequently, more Island-bred stock in their pedigrees. The females in each group of the pedigrees had a smaller proportion of Island-bred individuals than the males had in each of the groups.—(11) Study of the pedigrees of these two groups of sires discloses the fact that all the animals which appeared in the pedigrees of the superior sire on the male side of the pedigrees more than four times or on the female side of the pedigree more than three times also had appearances in the pedigrees of the sires inferior in their transmitting qualities. This fact alone makes it clear that the appearance of certain famous animals in the pedigree of a given bull is no guarantee of that particular bull's worth.—*John W. Gowen.*

713. Pomeroy, C. S. **"Sports" or bud-variation in the rose.** Amer. Rose Ann. 1919: 36–37. Mar. 15, 1919.—Rose has greater number of recognized bud varieties than any other plant. Carrière (1865) noted 50 standard roses of "bud-sport" origin, and his list was incomplete. 1918 Rose Annual mentioned 90 "bud-sport" varieties, none of which were included in Carrière's list. Killarney, Radiance and Ophelia are in a mutating stage of development —more or less unstable—and give rise to numbers of bud varieties. No artificial method of inducing "bud sports" is known. "Bud sports" are generally comparatively stable. United States Department of Agriculture, through the writer, desires to secure a complete list of all varieties of plants which have originated as "bud sports." Information should include name of parent variety, description of new form, place found, and name of finder. If desired, such information would remain confidential.—*Orland E. White.*

714. Punnett, R. C. **Mendelism.** *5th ed., 13 × 19 cm., v + 219 p., 7 pl., 52 fig.* Macmillan & Co.: London, 1919.—This edition differs from the fourth in that several chapters have been re-written, and two chapters (X and XII) have been added to present the results of the *Drosophila* work, and the chromosome theory which has grown out of that work. Author does not agree with Morgan that "as the result of these researches, the problem of heredity has been solved," but he does concede that the work with *Drosophila* constitutes "the most noteworthy contribution to genetical studies" since the appearance of the last edition in 1912.—*G. H. Shull.*

715. Rasmuson, J. **Mendelnde Chlorophyll-Faktoren bei Allium cepa. [Mendelian chlorophyll factors in Allium Cepa.]** Hereditas **1:** 128–134. 1920.

716. Rasmuson, Hans. **Über einige genetische Versuche mit Papaver Rhoeas und Papaver laevigatum. [Some genetical experiments with Papaver rhoeas and Papaver laevigatum.]** Hereditas **1:** 107–114. 1920.

717. Rosendahl, H. V. **Tre för norra Europa nya Asplenier. [Three new Aspleniums for northern Europe.]** Bot. Notiser 1918: 161–168. 1918.—At Taberg in Småland (Sweden) *Asplenium adulterinum* was found, there, as in other places in Europe, growing on serpentine ground. Also the hybrid *Asplenium adulterinum* × *viride* was there to be seen. Its spores are entirely undeveloped.—*K. V. Ossian Dahlgren.*

718. Russell, S. F. **Inheritance of characters in sheep.** Oklahoma Agric. Exp. Sta. Bull. 126. *22 p., 8 fig.* 1919.—From crosses of Shropshire-Dorset, Shropshire-Rambouillet, Dorset-Rambouillet, Dorset-Merino, Shropshire-Merino, and back crosses, author concludes that absence of folded skin, dark markings of the Shropshire, early breeding of Dorsets, and, in females, hornless character of Shropshires, are dominant. A dominance of mutton conformation was maintained and Merinos and Rambouillets transmitted their density of fleece. Data on time of lambing and relative prolificacy are given.—*Elmer Roberts.*

719. Shamel, A. D. **Origin of a grapefruit variety having pink-colored fruits.** Jour. Heredity **11:** 157–160. *4 fig.* April, 1920.

720. Shull, Charles A. **Variation in Abutilon Theophrasti Medici.** Science 52: 41. July 9, 1920.—Author's abstract of paper read before Seventh Annual Meeting, Kentucky Academy of Science, Lexington, May 8, 1920:—This paper is a report of progress in an investigation of variability in the number of carpels in the ovaries of *A. Theophrasti.* The range of variability is from ten to seventeen, with the mode usually on 14 or 15. The material shows a skewed frequency distribution, and tendency toward half-Galton curves. A number of plants have been found with half curves and the mode on 15. But whenever a number of plants are counted together, there are usually a small number falling on 16. Only 3 specimens in about 8000 had 17 carpels to the ovary. The mode falls on a lower number in material collected in Kansas than in similar material from Kentucky. The drier climate of Kansas is probably responsible for this difference. If plants from an unfavorable habitat are counted the mode

is found to be depressed. The modifications of the variability curves noted are probab related rather directly to nutritional conditions. Heredity and suboptimal nutrition a believed to be responsible for the half-curve variability.—*Charles A. Shull.*

721. Shull, J. Marion. **Concerning Iris colouration.** Gard. Chron., 67: 291. June 1 1920.—Author presents observations on *neglecta* forms of *Iris*, which are colored forms lack ing yellow plastids, and points out that it is to be expected that such will show a clear purp or violet rather than a brownish coloration, since latter is composite effect of anthocyani and yellow plastids. Further observes that yellow occurs in both "standards" and "falls while anthocyanin may not be so distributed. Non-hereditary freak bearing on browniss and purple coloration is also described.—*James P. Kelly.*

722. Sirks, M. J. **Erfelijkheids- en selectieonderzoekingen bij Vicia-soorten. I. D Navelkleur van Vicia faba.** [Inheritance and selection experiments in Vicia species. I. Th eye-color of Vicia faba.] Genetica 2: 193-199. May, 1920.

723. Sirks, M. J. [Dutch rev. of: Castle, W. E. **Studies of heredity in rabbits, rats and mice.** Carnegie Inst. Washington Publ. 288. *56 p., 3 pl.* 1919.] Genetica 2: 248-251 May, 1920.

724. Sirks, M. J. [Dutch rev. of: Dahlgren, K. V. Ossian. **Erblichkeitsversuche mit einer dekandrischen Capsella bursa-pastoris (L.).** (Gentical investigations with a decandrous Capsella bursa-pastoris (L.).) Svensk Bot. Tidsskr. 13: 48-60. *2 fig.* 1919. (See Bot. Absts. 3, Entry 616.)] Genetica 2: 254. May, 1920.

725. Sirks, M. J. [Dutch rev. of: Fruwirth, C. **Handbuch der landwirtschaftlichen Pflanzenzüchtung. 3. Die Züchtung von Kartoffel. Erdbirne, Lein, Hanf, Tabak, Hopfen, Buchweizen, Hülsenfruchtern und kleeartigen Futterpflanzen.** (Handbook of agricultural plant breeding. 3. The breeding of potatoes, Jerusalem artichokes, flax, hemp, tobacco, hops, buckwheat, legumes and clover-like forage plants.) *3rd ed., 240 p., 45 fig.* P. Parey: Berlin, 1919.] Genetica 2: 257. May, 1920.

726. Sirks, M. J. [Dutch rev. of: Fruwirth, C., Th. Roemer, E. von Tschermak. **Handbuch der landwirtschaftlichen Pflanzenzüchtung. 4. Die Züchtung der vier Hauptgetreidearten und der Zuckerrübe.** (Handbook of agricultural plant breeding. 4. Breeding of the four chief cereals and sugar beets.] *3rd ed., 8vo., xv + 504 p., 42 fig.* Paul Parey: Berlin, 1918.] Genetica 2: 256. May, 1920.

727. Sirks, M. J. [Dutch rev. of: Schaxel, J. **Grundzüge der Theorienbildung in der Biologie.** (Principles of theory formation in biology.) *221 p.* G. Fischer: Jena, 1919.] Genetica 2: 267–268. May, 1920.

728. Sirks, M. J. [Dutch rev. of: Schaxel, Julius. **Über die Darstellung allgemeiner Biologie.** (On the presentation of general biology.) Abhandl. Theoret. Biol. *62 p.* 1919.] Genetica 2: 268–269. May, 1920.

729. Sirks, M. J. [Dutch rev. of: Tischler, G. **Ueber die Sogenannten "Erbsubstanzen" und ihre Lokalisation in der Pflanzenzelle.** (On the so-called hereditary substances and their localization in the plant cell.] Biol. Zentralbl. 40: 15-28. 1920.] Genetica 2: 271–273. May, 1920.

730. Sirks, M. J. [Dutch rev. of: (1) Tower, W. L. **The mechanism of evolution in Leptinotarsa.** Carnegie Inst. Washington Publ. 263. *viii + 284 p., 19 pl., 161 fig.* 1918. (See Bot. Absts. 4, Entry 794.) (2) Breitenbecher, J. K. **The relation of water to the behavior of the potato beetle in a desert.** *Ibid.* 263. *340 p., 19 pl.* 1918.] Genetica 2: 274–277. May, 1920.

731. Sirks, M. J. [Dutch rev. of: van Wisselingh, C. **Über Variabilität und Erblichkeit. (Variation and heredity.)** Zeitschr. indukt. Abstamm. Vererb. 22: 65-126. *10 fig.* Jan., 1920.] Genetica 2: 285–287. May, 1920.

732. Sirks, M. J. [Dutch rev. of: Ziegler, H. E. **Zuchtwahlversuche an Ratten. (Selection experiments on rats.)** Festschr. 100-jähr. Best. Kgl. Württ. Landw. Hochschule Hohenheim. *p. 385–399.* 1919.] Genetica 2: 287–288. May, 1920.

733. Smith, H. **Vegetationen och dess utvecklingshistoria i det central-svenska högfjällsomradet. [The vegetation of the central Swedish high-mountain region and the history of its development.]** (Inaugural dissertation.) Norrländskt handbibliotek IX. *185 × 270 mm., 238 p., 41 fig., 2 maps.* Upsala, 1920.—In the list of the vascular plants of this region (Härjedalen and parts of Jâmtland) the finding of a great number of hybrids is mentioned, namely: *Woodsia alpina × ilvensis, Equisetum trachyodon* (= *E. hiemale × variegatum*), *Calamagrostis neglecta × purpurea, Carex brunnescens × Lachenalii, C. canescens × loliacea, C. Goodenoughii × rufina, C. Goodenoughii juncea × rufina, C. aquatilis × Goodenoughii, C. livida × vaginata, C. atrata × Halleri, C. flava × Hornschuchiana, C. rotundata × saxatilis, Juncus arcticus × filiformis, Luzula confusa × spicata, L. arcuata × spicata, L. sudetica × spicata, Orchis cruenta × maculata, Salix caprea × lapponum, S. nigricans × phylicifolia, S. arbuscula × herbacea, S. arbuscula × lapponum, S. arbuscula × reticulata, S. hastata × herbacea, S. hastata × lanata, S. hastata × reticulata, S. glauca × myrsinites, S. glauca × nigricans, S. glauca × phylicifolia, S. myrsinites × nigricans, S. herbacea × lanata, S. herbacea × lapponum, S. herbacea × reticulata, S. herbacea × polaris, Betula nana × pubescens, Stellaria calycantha × longifolia, Cerastium alpinum × vulgare, Sagina intermedia × Linnaei, S. Linnaei × procumbens, Melandrium album × silvestre, Draba incana × rupestris, Viola epipsila × palustris, Epilobium anagallidifolium × lactiflorum, E. alsinifolium × palustre, E. Hornemanni × lactiflorum, Euphrasia minima × tenuis, Erigeron borealis × politus.*—Interesting is a newly described species *Poa herjedalica.* C. A. M. Lindman has previously called this *Poa alpina × pratensis.* Most certainly it is produced by such a combination. Any viviparous forms have however never been found in this territory. Whether *Poa herjedalica* is a vegetatively propagated hybrid or a descendant of a hybrid it does not produce any noteworthy capacity for variations or any resemblance to either of the presumed parents.—*K. V. Ossian Dahlgren*

734. Sô, Masao, and Yoshitaka Imai. **The types of spotting in mice and their genetic behaviour.** Jour. Genetics 9: 319–333. *1 pl.* Mar., 1920.—Authors find two independent forms of spotting in mice: (1) Ordinary piebald, *s*, recessive to self, *S;* (2) Factor *D* producing dominant spotting when acting upon self-coated "Kasuri" race. Some factor acting upon piebald spotting produces dark-eyed white "Daruma" type. All mice homozygous for *D* perish probably during early ontogeny. "Kasuri" race often becomes sterile, especially upon female side, "Daruma" less frequently so. General results confirm previous work of reviewer and of Detlefsen.—*C. C. Little.*

735. Tedin, Hans. **The inheritance of flower colour in Pisum.** Hereditas 1: 68–97. *1 colored pl., 2 fig.* 1920.

736. Thomson, J. Arthur. [French rev. of: Dendy, A. Animal life and human progress. *8vo, ix + 227 p.* Constable & Co.: London, 1919.] Scientia 27: 322–324. 1920.

737. Thomson, J. Arthur. [French rev. of: Hensen, V. **Tod, Zeugung und Vererbung, unter besonderer Berücksichtigung der Meeresbewohner. (Death, reproduction and heredity with special reference to marine animals.)** *84 p., 20 fig.* Lipsius & Tischer: Kiel & Leipzig, 1913.] Scientia 14: 487. 1920.

738. Tischler, G. **Ueber die sogenannten "Erbsubstanzen" und ihre Lokalisation in der pflanzenzelle. [On the so-called hereditary substance and its localization in the plant cell.]** Biol. Zentralbl. 40: 15–28. 1920.—See Bot. Absts. 6, Entry 729.

739. Tischler, G. [German rev. of: de Vries, Eva. **Versuche über Frucht- und Samenbildung bei Artkreuzungen in der Gattung Primula.** (Studies on fruit and seed formation in species crosses in the genus Primula.) Recueil Trav. Bot. Néerlandais **16**: 63–205. 1919.] Zeitschr. Bot. **12**: 169–171. 1920.

740. Tjebbes. [Dutch rev. of: von Hofsten, N. **Ärftlighetslära.** (Genetics.) *17 × 26 cm., viii + 506 p., 191 fig., 1 colored pl.* P. A. Norstedt & Söners förlag: Stockholm, 1919. (See Bot. Absts. 3, Entry 2208.)] Genetica **2**: 263–264. May, 1920.

741. Tjebbes. [Dutch rev. of: Winge, Ø. **Om Nedarvningen af Hestend Lød.** (Inheritance of coat color in cattle.) Nordisk Jordbrugsforskning **1920**: 1–30. 1920.] Genetica **2**: 284–285. May, 1920.

742. Torsell, R. **Iakttagelser rörande den s. k. slidsjukans uppträdande a höstvete vid Ultuna sommaren 1918.** [Observation of the disease caused by Cicadula sexnotata, appearing on wheat at Ultuna in the summer of 1918.] Sveriges Utsädesf. Tidskr. **28**: 260–274. 1918.—Between different kinds of winter wheat there are differences in their resistance against the disease,—for each kind a particular resistance, apparently transmissible to the descendants. The power of resistance, seems to be directly influenced by different qualities, specially concerning the winter-hardiness. The most effective way to avoid the disease in question is to grow resistant and highly hardened sorts of wheat. [See also Bot. Absts. 6, Entry 746.]—*K. V. Ossian Dahlgren.*

743. van der Wolk, P. C. **Eine neue Phase der experimentellen Entwicklungslehre.** [A new phase of experimental evolution.] Umschau. **1920**: 63–66. 1920.

744. van Herwerden, M. A. [Dutch rev. of: (1) Calkins, G. N., and L. H. Gregory. **Variations in the progeny of a single ex-conjugant of Paramaecium caudatum.** Jour. Exp. Zool. **15**: 467. 1913. (2) Stocking, R. J. **Variation and inheritance in abnormalities occurring after conjugation in Paramaecium caudatum.** *Ibid.* **19**: 387. 1915. (3) Middleton, A. R. **Heritable variations and the results of selection in the fission rate of Stylonychia pustulata.** *Ibid.* **19**: 451. 1915. (4) Hegner, R. W. **Variation and heredity during the vegetative reproduction of Arcella dentata.** Proc. Nation. Acad. Sci. [U. S.] **4**: 283–288. Sept., 1918. (See Bot. Absts. 2, Entry 676.) (5) Ackert, J. E. **Effect of selection of Paramaecium.** Genetics **1**: 407. 1916. (6) Jennings, H. S. **Heredity, variation and the results of selection in Difflugia corona.** *Ibid.* **1**: 407–534. 1916. (7) Erdmann, R. **Endomixis and size variations in pure lines of Paramaecium aurelia.** Proc. Soc. Exp. Biol. Med. **16**: 60–65. 1919. (See Bot. Absts. 3, Entry 2123.)] Genetica **2**: 244–248. May, 1920.

745. van Herwerden, M. A. [Dutch rev. of: Goldschmidt, R. **Intersexualität und Geschlechtsbestimmung.** (Intersexuality and sex determination.) Biol. Zentralbl. **39**: 498–512. Nov., 1919.] Genetica **2**: 257. May, 1920.

746. Wahlstedt, I. **Iakttagelser rörande slidsjukans uppträdande å höstvete i Östergöttland sommaren 1918.** [Observations concerning the disease caused by Cicadula sexnotata on winter wheat in Östergötland.] Sveriges Utäsdesf. Tidskr. **28**: 195–215. *1 fig.* 1918.—Different varieties of fall wheat show different resisting power against attacks of *Cicadula sexnotata.* [See also Bot. Absts. 6, Entry 742.]—*K. V. Ossian Dahlgren.*

747. Welch, Paul S. [Rev. of: Patterson, J. T. **Polyembryony and sex.** Jour. Heredity **10**: 344–352. *2 fig.* Nov., 1919.] Trans. Amer. Microsc. Soc. **39**: 164–165. April, 1920.

748. Winge, Ø. **Om Nedarvningen af Hestend Lød.** [Color inheritance in cattle.] Nordbrungsforskning **1920**: 1–30. 1920.—See Bot. Absts. 6, Entry 741.

749. Winkler, H. **Verbreitung und Ursache der Parthenogenesis in Pflanzen- und Tierreiche.** [Distribution and cause of parthenogenesis in the plant and animal kingdoms.] *8vo, vi + 231 p.* Gustav Fischer: Jena, 1920.

750. Yampolsky, Cecil. **Further observations on sex in Mercurialis annua.** Amer. Nat. 54: 280–284. *1 fig.* May–June, 1920.—Author grew four plants of *Mercurialis annua* from seeds collected from a monoecious individual. In general habit of growth these four plants were like typical female plants. During the earlier part of the flowering season only female flowers were produced in each of the plants; later on male flowers and hermaphroditic flowers appeared along with the female flowers, the latter usually being more numerous than either of the others. Author suggests that sex is not a fixed condition in these forms of *Mercurialis annua* and that a plant may change its sex during the progress of its life cycle.—*Chester A. Darling.*

751. Zeleny, Charles. **Germinal changes in the bar-eyed race of Drosophila during the course of selection for facet number.** Proc. Indiana Acad. Sci. 1917: 73–77. 1918.—Writer selected for low facet- and high facet-number in the bar-eyed race of *Drosophila.* Selection was effective in both lines. Analysis of the results brings out the following facts: (1) The presence of germinal differences,—accessory unit factors,—at the beginning of selection. (2) The appearance of accessory genes during the progress of selection. (3) A change in the bar gene itself causing a return to full eye both somatically and germinally.—Another point of interest is the return of bar eye to full eye by a second route, namely, the appearance of a modifying factor in one of the autosomes.—*F. Payne.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

752. Anonymous. **Anatomical modification of roots by mechanical action.** [Rev. of: Bloch, E. **Concerning the modifications produced in the structure of roots and stalks by external compression.** (French.) Compt. Rend. Acad. Sci. Paris 158: 1701. 1914.] Sci. Amer. Monthly 1: 262. 1920.

753. Bailey, Irving W. **The formation of the cell plate in the cambium of the higher plants.** Proc. Nation. Acad. Sci. [U. S. A.] 6: 197–200. *8 fig.* Apr., 1920.—"A remarkable type of cytokinesis," previously reported by author for the cambium of the Coniferae, is now shown to occur in cambial initials of various representatitve angiosperms. Author states same phenomenon is found in other somatic cells "whose planes of division have one long and one short dimension." Comparative study indicates ordinary process of cell plate formation is simply extended in space and time where cell dimensions require it, to the limiting case where two widely separated "kinoplasmasomes" are formed at the free ends of the advancing cell plate.—*Howard B. Frost.*

754. Barratt, Kate. **A contribution to our knowledge of the anatomy of the vascular system of the genus Equisetum.** Ann. Botany 34: 201–236. *Pl. 8–9, fig. 1–7.* 1920.—A detailed description of the vascular system of *Equisetum*, particularly of the developmental stages in the sporeling, is given. The thoroughness of the work was made possible by a technique which rendered whole sporelings and pieces of the adult transparent so that the vascular system could be viewed as a whole. At the base of the young sporeling is a protostele which opens out into a siphonostele at the attachment of the vascular supply of the secondary axis and then closes again for a short distance. The basal regions of the several axes formed before a rhizome appears show compact siphonosteles. These axes arise endogenously whereas the whorled aerial axes develop from superficial cells. Contrary to views held by some workers the metaxylem of the vegetative axis all develops centrifugally; nor do any metaxylem strands cross the outer surface of the nodal wood, for they are linked together at this point by short nodal tracheids. There is no trace of secondary thickening at the nodes, the apparent increase in the number of elements attributed to secondary growth being really due to the displacement of developing tracheids. The conditions found in the cone lead the author to conclude that

the axis is not differentiated into nodes and internodes, that the gaps bear no relationship t sporangiophoric traces, that they are not leaf-gaps but are related to mechanical efficiency and that the sporangiophores are not the morphological equivalent of leaves but are organ *sui generis*. Throughout the plant the gaps are neither foliar nor ramular and have no mo phological value in questions of phylogeny.—*W. P. Thompson.*

755. BEEKMAN, H. **78 Preanger-houtsoorten, beschrijving, afbeelding en determinatie tabel.** [78 Preanger timber species described and illustrated, with determination table.] Mededeel. Proefsta. Boschw. Dept. Landb. Nijverheid en Handel Nederlandsch-Indië 5 1–186. *60 pl.* 1919.—See Bot. Absts. 6, Entry 83.

756. BERGMAN, H. F. **Internal stomata in ericaceous and other unrelated fruits.** Bull Torrey Bot. Club **47**: 213–221. *9 fig.* 1920.—Numerous cases of the occurrence of interna stomata are cited. These stomata remain mostly in an open condition and are not functional Their presence is explained by the fact that the fruit is a modified leaf, and their "persistenc must be regarded as an hereditary continuation of a stomata-producing tendency after th leaf has lost its normal form and function."—*P. A. Munz.*

757. BROWN, FOREST B. H. **The refraction of light in plant tissues.** Bull. Torrey Bot Club **47**: 243–260. *4 fig.* 1920.—In order to get the clearest definition of tissue outlines unde the microscope, it is necessary to know the refractive properties of these tissues. Refractio can be measured under the microscope by the use of a gradient series of media of know refractive powers, such as castor oil, clove oil, and naphthalene α monobromated. Direc tions are given for preparing such a series of media and the tissues for study. Methods o illumination and examination under the microscope are also given. It is found that in a given tissue, refraction may vary widely with imbibition and growth. To secure clearnes of anatomical details, such as pits and middle lamellae, it is desirable to have a medium wit the index of refraction below that of the tissue substance.—*P. A. Munz.*

758. BROWNE, ISABEL M. P. **A third contribution to our knowledge of the anatomy of the cone and fertile stem of Equisetum.** Ann. Botany **34**: 237–264. *Pl. 8–9, fig. 1–7*, 1920.—The vascular systems of the cones of *Equisetum hyemale* and *E. giganteum* are described and com pared with those of species previously studied. The cones of the different species can be ar ranged in a series, which is not to be considered a phylogenetic one, with respect to the degree of reduction of the vascular system. This reduction tends more and more to obscure both the relation of meshes (gaps) to traces and the alternation of traces in the successive whorls. The author is of the opinion that the sporangiferous annulus is a recent development in the phy logeny of the genus, the sporangia having spread to regions which were not at first sporangif erous.—*W. P. Thompson.*

759. CHODAT, R. **Le Hugueninia tanacetifolia.** Bull. Soc. Bot. Genève **11**: 60–61. 1919. —The flower and inflorescence of this species are described.—*W. H. Emig.*

760. CHODAT, R. **La floraison du Lilium Martagon** [**The flowering period of Lilium Martagon.**] Bull. Soc. Bot. Genève **11**: 50–59. *Fig. 1–5.* 1919.—The changes that take place in the flower from anthesis to the maturity of the fruit are described.—*W. H. Emig.*

761. COCKAYNE, L. **On the seedling form of the coral-shrub (Helichrysum coralloides (Hook. f.) Berth. & Hook. f.).** New Zealand Jour. Sci. Tech. **2**: 274–278. July, 1919.

762. DESHMUKH, G. B. **Polyembryony.** Gardens' Bull. Straits Settlements **2**: 258. 1920. —Cases of polyembryony are recorded for *Citrus decumana* L. and *Persea gratissima* Gaertn. —*T. F. Chipp.*

763. DODGE, B. O. **The life history of Ascobolus magnificus—Origin of the ascocarp from two strains.** Mycologia **12**: 115–134. *Pl. 7–8, 28 fig.* 1920.—"The ascocarp of *Ascobolus magnificus* originates from a pair of morphologically distinct primordia—a large ascogonium

the end of which functions as a trichogyne, and a club-shaped antheridium. *Papulospora magnifica* Hotson is an asexual stage of *Ascobolus magnificus* Dodge. The intrahyphal mycelium found in old cultures is simply a case of "Durchwachsungen" or "cordon interne." The strains here reported, which were obtained from germinated papulospores or ascospores, were self-sterile in the experiments conducted, but always produced papulospores. Sexual reproduction occurs in cultures containing two strains properly chosen."—*H. R. Rosen.*

764. Harvey, R. B. **Relation of catalase, oxidase, and H-concentration to the formation of overgrowths.** Amer. Jour. Bot. 7: 211–221. *2 fig.* 1920.—See Bot. Absts. 6, Entry 1353.

765. Henry, A. **The Douglas firs, a botanical and silvicultural description of the various species of Pseudotsuga.** Pharm. Jour. 104: 128. 1920.

766. Jacobson, Mrs. R. **Scutellaria alpina et sa biologie florale.** [**Scutellaria alpina and its floral biology.**] Bull. Soc. Bot. Genève 11: 62–63. 1919.—The author describes the visits of insects and the process of pollination.—*W. H. Emig.*

767. Jennings, O. E. **The paper mulberry and "artillery plant."** Torreya 20: 52–53. 1920.—See Bot. Absts. 6, Entry 1350.

768. Loeb, J. **Quantitative laws in regeneration. I.** Jour. Gen. Physiol. 2: 297–307. 1920.—See Bot. Absts. 6, Entry 867.

769. Oschwald, Marie. **Observations sur la biologie florale des campanules.** [**Observations on the floral biology of species of Campanula.**] Bull. Soc. Bot. Genève 11: 64–69. *1 fig.* 1919.—A description of the floral parts of several species of *Campanula* accompanies the details regarding their pollination.—*W. H. Emig.*

770. Przibram, Karl. **Form und Geschwindigkeit. Ein Beitrag zur allgemeinen Morphologie.** [**Form and rapidity of movement. A contribution to general morphology.**] Naturwissenschaften 8: 103–107. 1920.—Dependence of form on the rapidity of growth in *Polypodium vulgare* is noted. Figures show differences in form when grown at different rates.—*Orton L. Clark.*

771. Sabnis, T. A. **The physiological anatomy of the plants of the Indian Desert.** Jour. Indian Bot. 1: 65–83. 97–113, 183–205, 237–251. *Pl. 3–14.* 1919-1920.—A study of Capparidaceae to Lythraceae (Bentham and Hooker's system). The salient features of leaf and stem anatomy are described and figured from herbarium material. [See also Bot. Absts. 5, Entry 1904.]—*Winfield Dudgeon.*

772. Sawhney, Kali Das. **The vascular connections and the structure of the tendrils in some Cucurbitaceae.** Jour. Indian Bot. 1: 254–262. *7 fig.* 1920.—The author has examined the vascular anatomy of the node and the vascular connections of the nodal appendages of 12 species of cultivated Cucurbitaceae. Tendrils, buds, and floral axes are connected with the nodal plexus of the inner ring of 5 cauline bundles, while the leaves are connected with the outer rings of cauline bundles. He concludes that the vascular connections and structure of the basal part of branched tendrils show that they are homologous with ordinary shoots; that the arms of branched tendrils and the upper part of simple tendrils are homologous with leaves; and that simple tendrils have been derived from branched tendrils.—*Winfield Dudgeon.*

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

FUNGI

773. ATWOOD, ALICE C. **Errors in Lindau's "Thesaurus" and Saccardo's "Sylloge."** Mycologia 12: 169–171. 1920.

774. BAILEY, M. A. **Puccinia malvacearum and the mycoplasm theory.** Ann. Botany 34: 173–200. 1920.—A brief summary of the essential aspects of the mycoplasm hypothesis is followed by a detailed outline of the results obtained by ERIKSSON in his investigations of the rust of hollyhock. The writer's own results in his experiments with this same organism are then contrasted with those of ERIKSSON. He finds himself in marked opposition to the observations and deductions of the latter worker. He finds that the tendency of the pro mycelium in this species to break up into "oidia" rather than to form normal sporidia is merely the result of environmental conditions, and can be noted especially when the teleutospores are completely submerged. His experiments are discussed in detail, and the results are given in tabular form. He describes the apparatus which was used to insure freedom from outside infection, and discusses critically every aspect of his experimental work.—*H. M. Fitzpatrick.*

775. JACKSON, H. S. **New or noteworthy North American Ustilaginales.** Mycologia 12: 149–156. 1920.—The bunt of rye, hitherto unreported from U. S. A., was detected in a collection made by L. M. UNDERWOOD in New York, 1892. It is determined as *Tilletia Secalis* and considered distinct from *T. Tritici*. *T. Holci* is reported on species of *Notholcus* from Oregon. *Entyloma Collinsiae* is reported from Oregon on two new hosts, *Collinsia grandiflora* and *C. tenella*. From the same state *Urocystis Trillii* sp. nov. is described on *Trillium chloropetalum*. Collections on *Quamasia hyacinthina* from Indiana and *Q. quamash* from Oregon are assigned to *Urocystis Ornithogali*. *Tubercina Trientalis* is reported on a new host, *Trientalis latifolia* and from a new locality, Oregon. Because of morphological differences as well as different genera of hosts attacked *Cintractia axicola minor* Clinton is raised to specific rank, *C. minor* (Clinton) comb. nov. *Cerastium oreophilum*, *Silene Watsoni* and *Stellaria Jamesiana* are reported as new hosts for *Sorosporium Saponariae*. *Tolyposporium Iresine* is described and the new combination *Thecaphora Iresine* (Elliott) is made. *Tolyposporium Junci* is reported for the first time from North America; two Oregon collections on *Juncus bufonius* are recorded. —*H. R. Rosen.*

776. KILLERMAN, S. **Fund von Polyporus montanus Quélet in Bayern. [Discovery of P. montanus in Bavaria.]** Hedwigia 61: 1–3. *1 pl.* 1919.—A large (60 cm. diam.) polypore was found at the base and on the large roots of the "big fir" at Waldhaus, in the Bavarian forest. A description and illustrations are presented. Critical comparison with described species leads to the conclusion that it is *P. montanus.*—*D. Reddick.*

777. KRIEGER, LOUIS C. C. **Field key to the genera of the gill mushrooms.** Chart (17 X 28 in.) with 8 pages of text. The Norman Remington Co.: Baltimore, 1920.—Chart is printed in black on white paper, and is folded into a small, pocket-size, press-board covered booklet containing eight pages of explanatory matter. It is designed for field use, but can also be used as a wall chart. The principal genera of the Agaricaceae are included, and an attempt has been made to furnish an illustrated key which will enable the novice to determine the generic position of mushrooms as they are collected in the field. Genera known to contain poisonous species are indicated.—*H. M. Fitzpatrick.*

778. MURRILL, W. A. **Another new truffle.** Mycologia 12: 157–158. *1 fig.* 1920.—Material collected by DR. C. L. SHEAR in Maryland and first studied by DR. H. W. HARKNESS is described as *Tuber Shearii* Harkness, sp. nov.—*H. R. Rosen.*

779. Murrill, W. A. **Oudemans' work on fungi.** [Rev. of: Oudemans, C. A. J. A. **Enumeratio systematica fungorum.** Vol. I. *cxxvi + 1230 p.* Martinus Nijhoff: The Hague, 1919.] Mycologia 12: 169. 1920.—"This first volume is valuable because of its extended bibliography and numerous citations to the literature of the fungi which it contains. As a host index for the fungi, it includes all European plants [cryptogams to orchids; remainder of monocotyledons and all dicotyledons to appear in subsequent volumes], many of which occur also in the United States, and also all plants grown in conservatories in Europe, among which will be found many species from tropical America."—*H. R. Rosen.*

780. Odell, W. S. **A rare fungus new to Canada.** Canadian Field-Nat. 34: 10–13. *6 fig.* 1920.—*Morchella bispora* Sor. was first found in Canada at Chelsea, Quebec, and near Ottawa, Ontario.—*W. H. Emig.*

781. Overholts, L. O. **Some mycological notes for 1919.** Mycologia 12: 135–142. *Pl. 9–10.* 1920.—Notes based on collections made in Pennsylvania, clarifying and amplifying previous descriptions of the following fungi: *Clavaria ornatipes* Peck, *Craterellus pistillaris* Fr., *Fomes bakeri* (Murrill) Sacc., *Merulius aureus* Fr., *Mucronella ulmi* Peck, *Paxillus corrugatus* Atk., *Polyporus Schweinitzii* Fr., *Poria semitincta* Peck., *Tremella sparassoidea* Lloyd, *Tremella vesicaria* Fr., *Tremellodon gelatinosum* (Scop.) Fr., *Trichoglossum hirsutum* (Pers.) Boudier.—*H. R. Rosen.*

782. [Pennell, Francis W.] **Index to American mycological literature.** Mycologia 12: 172–174. 1920.

783. Standley, Paul C. **Rusts from Glacier National Park, Montana.** Mycologia 12: 143–148. 1920.—A list of 61 species of rusts collected by the writer and determined by Dr. J. C. Arthur.—*H. R. Rosen.*

784. Subramiam, L. S. **A Pythium disease of ginger, tobacco, and papaya.** Mem. Dept. Agric. India (Bot. Ser.) 10: 181–194. *Pl. 1–6.* 1919.—The morphology of the fungus, its systematic position, and remedial measures for the disease are described. The name *Pythium Butleri* is proposed.—*F. M. Schertz.*

785. Suematsu, N. **On the artificial culture of Helminthosporium Oryzae.** Bot. Mag. Tokyo 33: 291–297. *3 fig.* 1919.—A new method of isolating the fungus is reported. A small piece of diseased leaf is removed to a petri-dish containing rice-leaf decoction agar. After two days plenty of spores are formed, then by transferring one of the spores a pure culture is secured. Germination of the spores of the fungus generally takes place at both ends of the cell. Secondary spore formation does not occur so frequently as observed by Ravn in his *Hel. gramineum.* In drop culture conidiophores bear one to four spores, and frequently fertile tips continue growth as successive conidia are formed. Spore formation takes place in bright daylight. Cultural experiments with use of several culture media were performed, and the results are tabulated in detail.—*T. Matsumoto.*

LICHENS

786. Havaas, Johan. **Lichen vegetationen ved Mosterhavn.** [**Lichen vegetation by Mosterhavn.**] Bergens Mus. Aarb. (Naturh. Raekke) 1917-1918: 1–53. 1918.—List, by Mosterhavn, of lichens from the vicinity of Bergen, including a number not before found in Norway. The moist climate with little snow is favorable to lichens.—*A. Gundersen.*

787. Lettan, G. **Beiträge zur Lichenographie von Thüringen.** [**Lichenography of Thuringia.**] Hedwigia 61: 97–175. 1919.—Collections made in practically all parts of Thuringia, including particularly valleys and mountains. Distribution with respect to elevation, geological formation, dominant vegetation, etc.; 549 species are described, 70 being new to Thuringia, 4 or 5 new to Germany, none new to science.—*D. Reddick.*

788. Watson, W. **Lichens of Llanberis and district.** Jour. Botany 58: 108–110. 192C —The list given supplements that of Wheldon (Jour. Botany 58: 11–15). About ninet forms are considered.—*K. M. Wiegand.*

BACTERIA

789. Peterson, W. H., and E. B. Fred. **The fermentation of glucose, galactose anc mannose by Lactobacillus pentoaceticus n. sp.** Jour. Biol. Chem. 42: 273–287. 1920.—See Bot. Absts. 6, Entry 1338.

790. Winslow, C.-E. A., William Rothberg, and Elizabeth I. Parsons. **Notes on the classification of the white and orange Staphylococci.** Jour. Bact. 5: 145–167. 1920.—One hundred and eighty strains of *Staphylococcus* were collected from various sources, 104 of which were from pathological conditions in man and animals. Several tests were made on each strain, and the conclusions are reached that the generic names *Aurococcus* and *Albococcus* used by the Winslows should not be retained for this group but, that all should be included under the genus *Staphylococcus*. Of the forms studied, six species are recognized, based on the color of pigment formed, the power of fermenting lactose, and the power of liquefying gelatin. The species recognized are *St. aureus* Rosenbach, *St. aurantiacus* Schroter, *St. epidermidis* Gordon, *St. candidus* Cohn, *St. tetragenus* Gaffky. and *St. candicans* Flugge.—*Chester A. Darling.*

MYXOMYCETES

791. Lister, G. **Mycetozoa from Cornwall.** Jour. Botany 58: 127–130. 1920.—A short account is given of the activities of Alfred Adams as a collector and student of Mycetozoa, especially in Cornwall. A list of 82 species and 4 varieties is given as occurring in Cornwall. This list is based on the work of Adams and on notes by. G. H. Fox and J. M. Coon.—*K. M. Wiegand.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. Berry, *Editor*

792. Benson, W. N. **A review of recent researches on the mesozoic floras of Australasia.** New Zealand Jour. Sci. Tech. 2: 29–32. 1919.—Views of Walkom, Arber and others are compared, especially as to correlation of Australian and New Zealand strata. Australian mesozoic flora has four times as many species as that of New Zealand.—*A. Gundersen.*

793. Berry, Edward W. **The ancestors of the Sequoias.** Nat. Hist. 20: 152–155. *Maps and plate.* 1920.—Brief account of the geological history of *Sequoia*, with maps showing Mesozoic and Cenozoic occurrences.—*E. W. Berry.*

794. Cockerell, T. D. A. [Rev. of: Knowlton, F. H. **A catalogue of the Mesozoic and cenozoic plants of North America.** U. S. Geol. Surv. Bull. 696. *815 p.* 1919.] Torreya 20: 53–57. 1920.—Enumerates 4789 accepted forms, including the fossil plants of Alaska, but excluding those of Greenland and Mexico. The species are listed by strata and localities. Nearly all the genera of woody plants well represented today in North America appear also in the Tertiary flora. The herbaceous plants are very scantily represented.—*J. C. Nelson.*

795. Conklin, E. J. **The rate of evolution.** Sci. Monthly 10: 589–602. 1920.—The results of evolution are diversity, adaptation and progress. Diversity appears as varieties, species and genera, but they are usually better adapted than their ancestors. The first is the most evident phase and the one dealt with in experimental evolution.—Differences may be classified as (1) fluctuations, (2) new combinations, (3) mutations. Fluctuations are due to environment and are the modification of the soma rather than of the germplasm, of the individual development rather than heredity. They are of little evolutionary value. New combinations of Mendelian factors in sex reproduction give the most common inherited diversity.

This is Burbank's method of producing his "new creations in plant life." It is usually possible after a few generations to get homozygotes that breed true and in this way a new variety is established. These may be of evolutionary value.—Genuine mutants have now been found in so large a number of plants and animals that it seems probable that all inherited differences appeared in the first instance in this way.—The rate at which mutations appear seems to differ greatly in different species. But they are probably of more frequent occurrence than is now known. Drosophila has furnished the largest number of mutants now known. Many of these contain lethal factors causing the early death of the individual.—Whether mutations are caused by environmental conditions is at present unknown, although Muller and Altenburg found them more frequent at high temperatures.—Species are presumably the result of the heaping up of viable mutations. The approximate number of known living and extinct species in the different phyla of the animal kingdom differs very greatly, e.g., Protozoa 8000, Rotifera 500, Arthropoda 400,000, Pisces 13,000, Amphibia 1,400, Reptilia 3,500, Aves 13,000, Mammalia 3,500. It is apparent that the number of species in a group is not dependent entirely upon its age. Birds, which arose in Jurassic, have three times as many species as Mammals, which appeared in Triassic.—The number of species is not dependent on the number of individuals produced, nor upon their rate of reproduction. Birds, which are relatively few in number of individuals and of eggs produced, have as many species as the much older class of fishes, which lay perhaps a thousand times as many eggs. In general it seems that evolution has been more rapid where fewer, better cared for young are produced.—Size does not seem to be directly related to the rate of evolution, nor does it seem to be dependent always upon changes in environment and diversities of habitat. Many paleontologists mention that the rate and direction of evolution are determined by environmental changes and speak of "waves of evolution." The number of mutations that survive and give rise to species is limited by environment, that is by natural selection. Rate of mutation seems to depend upon the particular organization of the germplasm, some types being relatively stable with few mutations, other types relatively unstable with numerous mutations.—The fact of survival is evidence of adaptation, and the rate of adaptation does not seem to be proportional to the rate of reproduction, but rather to have gone farther in organisms in which the rate of reproduction and of elimination is relatively slow.—Thousands of species appear which do not lead to any increase in complexity. There are probably more than a million species and yet there have been relatively few lines of progress. Every mutant does not represent the beginnings of a new path of evolution. Increasing complexity must have depended upon rare and fortunate mutations which contained the possibilities of further evolution. Certain species are too highly specialized to give origin to new lines of progress.—The utmost limits of progressive organization within the limits of a single cell were probably reached before Proterozoic time. Since that time the paths of progress are in multicellularity, multiplicity of tissues, organs and parts, compound organisms, social evolution and rational evolution of human society.—In conclusion, the suggestion is made that recent theories as to causes of evolution are not wholly satisfactory. There may be important factors in evolution not yet "dreamed of in our philosophy."—*L. Pace.*

796. Davies, D. **Distribution of the different species of flora and fauna from the Westphalian and part of the Staffordian series of Clydach Vale and Gilfach Goch, east Glamorganshire.** Trans. Inst. Mining Eng. 59: 183–221. July, 1920.—A compilation of 25 years' collecting from the Carboniferous of Wales, the fossil plants having been determined by R. Kidston. These number 4000 specimens and their chief value lies in the careful stratigraphic location of each, thus affording data for determining the range of the different species and their value in correlation.—The forms enumerated comprise 12 species of *Calamites*, 1 of *Equisetites*, 6 of *Asterophyllites*, 5 of *Annularia*, 9 of fructifications and miscellaneous calamite remains, 5 of *Sphenophyllum*, 8 of *Lepidodendron*, 1 of *Bothrodendron*, 1 of *Ulodendron*, 2 of *Lepidoploios*, 4 of *Lepidophyllum*, 1 of *Asolanus*, 1 of *Halonia*, 4 of *Lepidostrobus*, 18 of *Sigillaria*, 2 of *Stigmaria*, 14 of *Neuropteris*, 1 of *Zeilleria*, 21 of *Sphenopteris*, 1 of *Dolerophyllum*, 1 of *Alliopteris*, 5 of *Pecopteris*, 4 of *Mariopteris*, 2 of *Linopteris*, 1 of *Dactylotheca*, 2 of *Crossotheca*, 1 of *Corynopteris*, 5 of *Alethopteris*, 1 of *Eremopteris*, and a variety of seeds and miscellaneous remains.—*E. W. Berry.*

797. Dixon, H. N. **Description of the mosses.** Quart. Jour. Geol. Soc. London 75: 200 1920.—Identifies five common English lowland species of mosses from the Pleistocene of th Durham coast.—*E. W. Berry.*

798. Oyen, P. A. **Kalktuf i Norge.** [**Calcareous tufa in Norway.**] Norsk Geologisk Tidsskr. 5: 231–350. *27 fig.* 1919.—Describes Pleistocene and post Glacial plants from the Cal careous tufa in Norway.—*E. W. Berry.*

799. P., E. [Rev. of: Anonymous. **Report of the Advisory Committee on Brown Coal State of Victoria.** *32 p.* Mines Dept., Victoria: Melbourne, Sept., 1917.] New Zealand Jour. Sci. Tech. 1: 127. March, 1918.

800. Rands, H., and W. O. R. Gilling. **New Zealand brown coals.** Dominion of New Zealand, B. Sci. and Art, Bull. 1. *42 p.* Wellington, 1918.

801. Reid, C., and J. E. Marr. **Pleistocene deposits around Cambridge.** Quart. Jour. Geol. Soc. London 75: 226–227. 1920.—Lists the following representatives of an Arctic flora found in the Pleistocene at Barnwell Station, which is correlated with the late glacial deposits of the Lea Valley that contain strikingly similar Arctic flora: *Thalictrum albinum* L., *Ranunculus hederaceus* L., *lingua* L.?, *repens* L.?, *bulbosus* L., *amplexicaulis* L.?, *Draba incana* L., *Viola palustris* L., *Silene coelata* Reid, *Linum praecursor* Reid, *Rubus* sp., *Potentilla erecta* Hampe, *Anserina* L., *Hippurus vulgaris* L., *Myriophyllum spicatum* L., *Armeria arctica* Wallr., *Menyanthes trifoliata* L., *Betula nana* L., *Carpinus betulus* L., *Salix lapponum* L., *cinerea* L., *repens* L., *herbacea* L., *reticulata* D., *Sparganium minimum* Fr., *Potamogeton heterophyllus* Schreber, *densus* L., *obtusifolius* M. and K., *Eleocharis palustris* R. and S., *Scirpus* sp., *Carex incurva* Lightf., *vulpina* L., *Isoëtes lacustris* L.—*E. W. Berry.*

802. Reid, E. M. **Preliminary description of the plant remains.** Quart. Jour. Geol. Soc. London 75: 197–200. 1920.—Gives results of preliminary study of what the authoress calls the Castle Eden flora, found fossil on the Durham coast in fissures in the Permian Magnesian limestone. Fifty or more species chiefly rock and bank dwelling plants are recognized of which more than half are exotics showing resemblances to modern Asiatic forms; e.g., *Rubus floscu-losus*, now Chinese, is represented. This flora is considered as older than the celebrated Cromer plant bed and not younger (possibly slightly older) than the Teglian flora of the Dutch-Prussian border.—The author calls the age Pliocene. It might be more properly considered as early Pleistocene.—*E. W. Berry.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

Heber W. Youngken, *Editor*

E. N. Gathercoal, *Assistant Editor*

803. Anonymous. **Kauri-gum oil.** Chem. & Druggist 92: 9. 1920.—Crude kauri-gum distilled under commercial conditions in New Zealand yields an oil which is separated into motor spirit, 15 per cent, a solvent oil, 15 per cent, paint oil, 30 per cent, varnish oil, 30 per cent, and pitch the remainder.—*E. N. Gathercoal.*

804. Anonymous. **The economic resources of Burma-camphor.** Chem. & Druggist 92: 425. 1920.—*Blumea grandis*, DeCandolle (*Conyza grandis*, Wallach), a weed, 6 to 8 feet high, growing very abundantly on cut-over forest lands in Tavoy, Burma, yields a camphor reported to be identical with Chinese camphor. Steps are being taken by the Burma Forest Department to determine the commercial possibility of camphor from this source.—*E. N. Gathercoal.*

805. Anonymous. **Oil of pimento-leaves.** (Through Rept. Imp. Inst.) Chem. & Druggist 92: 390. 1920.—Leaves of *Pimenta acris* yield by steam distillation 2.9 per cent of a pale yellowish-brown volatile oil, of pleasant, aromatic odor, with a high percentage of phenols, almost entirely eugenol. Manufacturers to whom samples of the oil were submitted consider it equivalent to the oil from pimento fruit.—*E. N. Gathercoal.*

806. Anonymous. **Wild ginger.** (Through Agric. News, Imp. Dept. Agric. West Indies.) Chem. & Druggist 92: 177–178. 1920.—It has been assumed that the true ginger plant (*Zingiber officinale*) is not known in the wild state, though it doubtless is a native of tropical Asia, but extensive areas of wild true ginger plant were recently found in the Republic of Colombia along the Magdalena river in Goajira peninsula. These probably escaped from cultivation in Brazil when the Portuguese introduced ginger in the sixteenth century. Commercially, this wild ginger may prove a valuable source of the drug, though the rhizomes are small; also, this region may prove desirable for the cultivation of ginger.—*E. N. Gathercoal.*

807. Anonymous. **Poison ivy, oak and sumac.** Amer. Forestry 26: 306–307. *2 fig.* 1920.

808. Aston, B. C. **Preliminary notes on the tinctorial properties of the genus Coprosma (Family Rubiaceae).** New Zealand Jour. Sci. Tech. 1: 3. 1918.—The three widely distributed New Zealand shrubs *Coprosma grandifolia*, *C. linarifolia* and *C. arcolata*, have considerable tinctorial power: orange-yellow, bright yellow, and deep brown respectively. With alkaloids an intense purple was obtained. [See next following Entry, 809.]—*A. Gundersen.*

809. Aston, B. C. **The genus Coprosma as a source of dyes.** New Zealand Jour. Sci. Tech. 1: 264–267, 346–351. *1 pl. (with specimens of dyed wool), 1 table of colors.* 1918.—Color reactions of about twenty species of *Coprosma*, with summary of vegetable coloring matters. The coprosmas, with wide distribution and quick growth on waste lands, yield varied and lasting colors and are worthy of the fullest investigation. [See next preceding Entry, 808.]—*A. Gundersen.*

810. Beath, O. A. **Poisonous plants.** Proc. Soc. Promotion Agric. Sci. 39: 39–47. 1919. —See Bot. Absts. 6, Entry 475.

811. Browne, Frank. **Some constituents of opium smoke.** Pharm. Jour. 104: 274. 1920.—An analysis of the smoke of *dross* opium extract, which is largely smoked in the East, indicates that morphine (0.016 g. per 100 g. of extract) is less abundant than in the smoke of *chandoo* opium (0.100 g. in 100 g. of the opium). As dross opium extract is admitted by smokers to be stronger in effect than chandoo, this strength must be attributed to the pyridine bases, ammonia, hydrocyanic acid and such-like substances, rather than to the morphine.—An interesting comparison is made with the constituents of tobacco smoke as follows:

FROM 100 G. OF	CARBON MONOXIDE	MORPHINE	NICOTINE	AMMONIA	PYRIDINE	HYDROCYANIC ACID
	cc.	*g.*	*g.*	*g.*	*g.*	*g.*
Dross opium extract.....	—	0.016	—	0.395	0.147	0.0103
Tobacco.....	4124	—	1.16	0.360	0.150	0.004 to 0.010

—*E. N. Gathercoal.*

812. Cofman-Nicoresti, Jules. **The adulteration of olive oil.** Pharm. Jour. 104: 139. 1920.—A number of samples of olive oil recently examined were grossly adulterated with tea-seed oil, which has been condemned as an edible oil, on account of the presence of a poisonous saponin body in the pressed oil. The various commercial tea-seed oils possess physical constants very similar to olive oil and do not respond to Baudouin's or Halphen's tests. It may be detected by shaking 10 cc. of the sample oil with 10 cc. of a mixture of equal parts by weight of concentrated sulphuric acid, concentrated nitric acid and water. If tea-seed oil

exceeding 20 per cent is present, a distinct pink color will develop in the oily layer. If less than 20 per cent is present, the pink color is hardly distinguishable. Heating on a water-bath for 20 minutes tends to deepen the color. Some other oils, notably cotton-seed oil, also respond to this test but no pure olive oil does so.—*E. N. Gathercoal.*

813. Corfield, C. E., and E. Caird. **The fat of Momordica seeds.** Pharm. Jour. 104: 43. 1920.—An examination of the fat contained in the seeds of *Momordica cochinchinensis*, a cucurbitaceous plant indigenous to India, Formosa and the Philippines, indicates that it possesses certain characteristics of drying oils, without the property of producing a varnish as does linseed oil. After heating, it behaves as a semi-drying oil, and, admixed with drying oils, might be used in paints and varnishes. The seed kernels, by extraction with petroleum benzine, yield 47 per cent of fat. The fat obtained from the heated seeds by expression solidified on cooling to a pale green granular mass, easily liquified. On exposure to air and daylight it oxidized to a whitish mass easily pulverized. In a film exposed at 100°C., oxidation was complete in three days and the fat has assumed a stiff, granular, gelatinous form, easily disintegrated. The constants of the fat, its fatty acids and alcohols, indicate that it consists chiefly of the glyceryl esters of saturated fatty acids. Some unsaturated fatty acids are present but no wax-alcohols. The seeds contain no alkaloids.—*E. N. Gathercoal.*

814. Darbaker, Leasure K. **Vinegar bee.** Jour. Amer. Pharm. Assoc. 9: 510–512. 1920.—Author reports that in practically all vinegar bees examined there were present two main organisms: *Saccharomyces tyrisormis* and *Bacterium vermiformae.* Other organisms constantly found and isolated were *Mycoderma aceti* and *Mycoderma vini.* A discussion of these, as well as a number of other organisms follows.—*Anton Hogstad, Jr.*

815. Dott, D. B. **Opium assay from the international standpoint.** Pharm. Jour. 104: 199. 1920.—The desirability of internationally established processes of assay for potent drugs is indicated. The various opium assays of different pharmacopoeias are discussed. The process of the British Pharmacopoeia, with certain modifications adapted from the Japanese and the French pharmacopoeias, gave more accurate results in the hands of various workers than had hitherto been observed with any other process. Final titration rather than the weighing of the purified morphine was preferred and the elaborate process of the United States Pharmacopoeia was not approved.—*E. N. Gathercoal.*

816. Dox, Arthur W. **Notes on soy bean urease.** Amer. Jour. Pharm. 92: 153–157. 1920.—In a study of a number of different varieties of soy beans, as to the urease activity, the author reports that some difference exists, but that this difference appears to bear no relationship to the germinating power of the seed or the protein content of the latter. It was demonstrated that urease was in seeds that were practically dead. In regard to the best temperature to secure greatest activity, the author reports above 50° and probably below 60°.—*Anton Hogstad, Jr.*

817. Du Bois, Louis. **Cantharides assay.** Amer. Jour. Pharm. 92: 157–160. 1920.—A new method is given for the assay of cantharides, which is similar to that of Baudin, modified only so to make it a complete-extraction method, instead of an aliquot one, and which the author states is preferable to the present United States Pharmacopoeia method. The author states that the chief objection to the U. S. P. method is that lower results for both "combined and free" cantharidin were obtained by this than he obtained for "free cantharadin" alone by his method. The crystals obtained by the U. S. P. method were dark and resinous, while those obtained by the author's method were clean and white.—*Anton Hogstad, Jr.*

818. Farwell, O. A. **Adulteration of American centaury and maidenhair fern.** Bull. Pharm. 34: 238. 1920.—Three bales of American centaury examined by the author and weighing 472 pounds contained 113 pounds of drug true to name. The balance consisted of *Rhexia virginica* and *Stylosanthes biflora* which were not intermixed with the century but each species occupied a distinct layer by itself, the American centaury occupying the outermost por-

tion. In the case of the maidenhair fern, a layer of drug alternated with a shovelful of coarse gravel in regular succession. Five bags were examined, the total being increased 50 pounds by the gravel. In order to reduce the possibility of discovery to a minimum, each shovelful of gravel was deposited as nearly as possible in the middle of each layer of drug.—*H. W. Youngken.*

819. Garr, H. D., and George E. E'we. **Hemlock bark (Tsuga canadensis) for pharmaceutical purposes.** Jour. Amer. Pharm. Assoc. 9: 567–573. *3 fig.* 1920.—Evidence is presented to show the superiority of the rossed bark over the whole bark for pharmaceutical purposes. By separating and weighing the two portions, it was noted that the outer bark constituted 55.34 per cent while the inner bark was 44.66 per cent. In the percentage of extractive matter, using 32 per cent alcohol and hot water respectively, it was noted in general that there is no preference, quantitatively between the two barks, but qualitative preference is on the side of the extractive matter from the inner bark, since it is higher in tannin, oleoresin and volatile oil content and lower in the non-essential coloring and extractive matters. Tannin content is about 50 per cent greater in the inner bark. The outer bark contains, on the average, twice as much hot water-soluble coloring matter as the inner bark and 3½ times as much 32 per cent alcohol-soluble coloring matter. Microscopic examination showed a tremendously greater content of volatile oil and oleoresin content in the inner bark. Therefore the inner bark is to be preferred for pharmaceutical purposes. The microscopic structure and pharmaceutical uses are then discussed.—*Anton Hogstad, Jr.*

820. Holmes, E. M. **The importance of the medicinal plant and herb growing industry to Britain.** Chem. & Druggist 92: 421–22. 1920.—The Hungarian government has placed the medicinal herb industry under state control. The United States have exported *Cannabis Indica* of good medicinal value to England and are supplying Henbane, Belladonna and Digitalis to the British South African and Australian Colonies. Many American drugs can be grown readily in Britain. Among the almost unobtainable drug products of Russia are birch-tar oil (*Oleum Rusci*) which could easily and cheaply be obtained from the birch forests of Scotland; ergot, abundant in many rye fields and easily separated from the grain at the time of threshing; and santonin, obtainable from *Artemisia Gallica* var. *maritima*, which would probably do well in the salt marshes of Kent, where *Artemisia Gallica* flourishes. Many other drug and perfume plants and culinary herbs could be raised in Britain, in addition to those now profitably cultivated. The necessity of purity and quality and of government inspection is indicated.—*E. N. Gathercoal.*

821. Holmes, E. M. **The manna of the Scripture.** Chem. and Druggist 92: 25-26. 1920. —See Bot. Absts. 6, Entry 933.

822. Jermstad. **Vergleichende Untersuchungen und Identifizierung der vershiedenen Sorten von Rauchopium. [Comparative investigation and identification of different varieties of smoking opium].** [Rev. of: Simons, Fr. D. Journal of Industrial Engineering Chemistry, 1916, p. 345–351; and Pharm. Weekblad, 1919, p. 1540–1548.] Schweiz. Apotheker Zeitg. 20: 249–252. 1920.—Different methods of manufacture divide smoking opium into four classes: (1) That prepared by extracting gum opium with water, filtering and evaporating the filtrate to a syrupy liquid containing about 15–20 per cent of water. (2) That prepared by first, carefully heating, kneading and roasting before extracting with water. (3) A product obtained by using the opium obtained after processes 1 and 2, and admixing it with yen shee plus the scraped-out residue of the opium pipes. A detailed description of the properties used in the identification are given. The ash contents, charring temperature, and the melting points of the opium alkaloids are the diagnostic points of consideration used in the comparison. The average and range of alkaloids present in a good sample of opium are given in terms of percentage and also a quantitative method for the isolation of all the alkaloids present in the crude drug.—*B. H. Hoffstein.*

823. Maiden, J. H. **Plants which produce inflammation or irritation of the skin.** Agric. Gaz. New South Wales 31: 386. 1920.—Deals with a tree, *Pseudomorus Brunoniana*. Reference is given to previous articles dealing with other plants.—*L. R. Waldron.*

824. Smith, E. Philip. **Plant dermatitis.**—I. Jour. Botany **58**: 130–135. 1920.—Plants causing irritation of human skin may be divided into two groups: those having an irritating cell-sap, and those in which the active principle is excreted. Of the former group four cases are discussed in the present paper. Nettle-poisoning is described as caused by the penetration of the skin by slender flask-like hairs, the tips of which break off, allowing the injection of the cell-sap containing formic acid, albuminoids, etc. Formic acid is not a sufficient cause of the irritation especially in extreme cases in the tropics. The symptoms are discussed. Primula-poisoning is due to an oil secreted in the terminal glands of glandular hairs. Cases of Primula-poisoning are sometimes severe. Rhus poisoning was found by Paff to be due to an oil, which he extracted and purified. This is produced by all parts of the plant, even the pollen. Thorough scrubbing with soap and water is the best remedy. In the Scilly Isles the flower pickers are troubled by a "lily disease" which is due to the juice of various species of *Narcissus*. Oil of jonquil is not the cause of this, but probably the raphides, which are abundant. An abraded skin seems prerequisite in this case.—*K. M. Wiegand.*

825. Smith, W. G. **Special strains of medicinal plants by selection.** Pharm. Jour. **104**: 116. 1920.—While agricultural plant-breeding is largely done by public bodies and the results are published, experiments in medicinal plant-breeding are mostly by private cultivators, who naturally keep to themselves valuable information regarding improved production or quality. Cultivation, manuring and treatment may produce larger plants, but rarely change internal qualities such as the nature and yield of active principles. Increased yield or improved quality of active principles is brought about by the constant selection of the best individual plants in these respects and the production of pure lines from them. Hybridization, yielding new combinations, extends the range of possible improvement in any required direction. Many illustrations are cited, particularly, the great improvement made in recent years in French lavender with the development of *Lavendula vera fragrans* and *L. v. delphiniensis;* and the increased yield and improved quality of Hungarian mint oils from *Mentha crispa* and *M. piperita;* and the greatly enriched strains of American grown belladonna, stramonium and hyoscyamus.—*E. N. Gathercoal.*

826. Viehoever, Arno, and Joseph F. Clevenger. **Relative content of volatile oil and ash in sage leaves and stems.** Jour. Amer. Pharm. Assoc. **9**: 563–567. *2 fig.* 1920.—Examination of various parts of the sage plant, showed that the amount of volatile oil (volatile ether extract) found in the leaves was about three times as much as in the stem, the ratio being, 1.63:0.69, 1.26:0.49, 1.18:0.48, 1.06:0.29, 0.92:0.24; the herbaceous parts of the axis located close to or representing the top of the plant, yielded more volatile ether extract than the woody basal portions of the axis, the ratio being about 0.9 per cent : 0.2 per cent. Examination of material collected in Maryland and Virginia showed it to be below 1 per cent of volatile ether extract, which the authors state is quite likely explained by the fact that the material was collected in late summer or fall. Materials from Wisconsin yielded higher amounts. As the stems yielded considerably less of volatile ether extract than the leaves, a limitation of their amount is justified. Microscopic examination showed that the glands and glandular hairs containing the volatile oil are to be found only in the epidermis of leaves, petioles and herbaceous stems. They were found to be most abundant on the leaves, either upper or lower sides, and completely absent on woody stems.—Domestic sages indicate a tendency to possess a high total, and especially acid-insoluble, ash content. Leaves contain more ash than stems. A description of the glands and glandular hairs are included in the article.—*Anton Hogstad, Jr.*

827. Zakrzecki, H. L. H. **Java cinchona bark sales and analysis.** (Through Allgem. Landbouwweekblad voor Nederlandsch-Indië, Nov. 22, 1919.) Chem. & Druggist **92**: 390. 1920.—Growers are required to present to the Quinine Bureau their analysis of the sample of bark sent to the quinine manufacturer. If the manufacturer's analysis of the sample is higher than the planter's, the latter hears nothing of it, but if the manufacturer's analysis is lower by 0.15 per cent or more, of quinine sulphate, he has the right to reject the planter's analysis

and demand a control analysis by analysts approved by the Quinine Bureau. As there are several methods of analysis for quinine-content in vogue—the gravimetric, polarimetric, etc., which vary somewhat in results—the Quinine Bureau is to appoint a Commission to study these in order to establish a uniform method with the ultimate object of creating a single, central analytical laboratory.—*E. N. Gathercoal.*

PHYSIOLOGY

B. M. Duggar, *Editor*

Carroll W. Dodge, *Assistant Editor*

DIFFUSION, PERMEABILITY

828. Loeb, J. **Influence of a slight modification of the collodion membrane on the sign of the electrification of water.** Jour. Gen. Physiol. 2: 255–271. 1920.—Continuing work previously reported, the author shows that in solutions of electrolytes which have a tendency to induce negative electrification of water, that is, in solutions of acids, acid salts, and salts with trivalent and tetravalent cations, the diffusion of the water depends, not only upon the concentration and nature of the salts, but also upon the previous treatment of the membrane. The treatment consisted in filling the collodion bags with 1 per cent gelatin solution and allowing them to stand over night. This was followed by very thorough washing in water. The differences in the osmotic behavior of the normal and treated collodion membranes seemed to be due, not to alterations in permeability of the membrane, but to the fact that water, in bags treated with gelatin, under the conditions named, diffuses as if positively charged. For instance, when solutions of acid are separated from pure water by a gelatin-treated collodion membrane, negative osmosis occurs, while, if a membrane, not so treated, is used, positive osmosis occurs. A treatment of the collodion membrane with casein, egg albumin, blood albumin, or edestin affects the behavior of the membrane as does treatment with gelatin. Treatments with peptone, alanine, or starch have no such effects.—*Otis F. Curtis.*

829. Loeb, J. **Influence of the concentration of electrolytes on some physical properties of colloids and of crystalloids.** Jour. Gen. Physiol. 2: 273–296. 1920.—The effects of adding an alkali or a neutral salt to a 1 per cent solution of metal gelatinate at $P_H = 8.4$ or to neutral solutions of salts with monovalent cations, such as Na_2SO_4 or $K_4Fe(CN)_6$, etc., at concentrations of M/256, are similar in that the initial rate of diffusion of water through untreated collodion membranes towards these solutions is decreased and the permanent osmotic pressure is also lessened. The effects of the addition of electrolytes on diffusion of water into neutral solutions of salts with monovalent or bivalent cations can be explained on the basis that the ions influence the electrification of water and the rate of diffusion of electrified water. The similarity in the effects of electrolytes on initial diffusion of water through a membrane towards either colloidal metal gelatinates or a crystalloidal salt, as well as the similarity in the effects on osmotic pressure, suggests that the explanation of the phenomena is the same. If this is the case, it raises the question whether the effects of ions on osmotic pressure of colloidal solutions, as well as on other physical properties of colloids, such as swelling, may be due, not to their colloidal properties, but to the more general effects of ions on the electrification of water and the diffusion of such electrified water through membranes. Not only was there a similarity in the effects of ions on the diffusion of positively charged water particles towards metal gelatinates and crystalloidal salts, but there was also a close similarity in the effects of acids and neutral salts on the diffusion of negatively electrified water towards gelatin-acid salts and crystalloidal salts.—*Otis F. Curtis.*

830. McCool, M. M., and C. F. Millar. **Further studies on the freezing point lowering of soils and plants.** Soil Sci. 9: 217–233. *3 pl.* 1920.—The amount of water which froze at −1.5°C. in the leaves of crop plants was found by the use of the dilatometer to vary with the

species of plant. In general the greater the freezing-point depression of the cell sap the less the amount of easily freezable water. The concentration of the cell sap of roots as measured by the freezing-point method is decidedly influenced by the concentration of the soil solution in which the plants are grown, but the concentration of the cell sap of the tops is not so markedly affected. The amount of water which froze at −2.5° and −4°C. in the tops of barley and corn was not markedly influenced by varying the concentration of the nutrient solution added to the soil when the water content of the soil was held constant. When grown in soil of high, medium, and low water content the plants in the soil of high water content possessed more easily freezable water. When the water content varied, but the concentration of the soil was held constant, more water froze at −2.5°C. in the leaves of plants grown in soils of low water content.—*W. J. Robbins.*

MINERAL NUTRIENTS

831. Hartwell, Burt L., and S. C. Damon. **The value of sodium when potassium is insufficient.** Rhode Island Agric. Exp. Sta. Bull. 177. *29 p.* 1919.

832. Winslow, C.-E. A., and I. S. Falk. **The effect of mineral salts upon the viability of bacteria in water.** [Abstract.] Absts. Bact. 3: 5. 1919.

833. Aronovitch, B. **On the soluble toxic substances of the colon-typhoid group.** [Abstract.] Absts. Bact. 4: 9. 1920.

METABOLISM (GENERAL)

834. Bridel, Marc. **Sur la présence simultanée du gentianose et du saccharose dans les espèces du genre Gentiana.** [Simultaneous occurrence of gentianose and saccharose in Gentiana.] Compt. Rend. Soc. Biol. Paris 83: 24–25. 1920.—In addition to *Gentiana lutea*, where these two sugars had already been reported, the author determined their presence in *G. asclepiodea*, *G. punctata*, *G. cruciata* and *G. purpurea*. From September to November the gentianose decreased while the saccharose increased in amount almost proportionally. It is suggested that these are convertible one into the other under the action of the enzyme gentiobiase.—*E. A. Bessey.*

835. Bronfenbrenner, J., and M. J. Schlesinger. **Carbohydrate fermentation by bacteria as influenced by the composition of the medium.** [Abstract.] Absts. Bact. 3: 8. 1919.

836. Cooledge, L. H., and R. W. Wyant. **The sanitary quality of milk as judged by the colorimetric hydrogen ion determination.** [Abstract.] Absts. Bact. 4: 6. 1920.

837. De Dominicis, A. **Sul significato biologico delle sostanze tanniche. Variazioni del contenuto in tannino nella corteccia di castagno secondo i mesi e le stagioni.** [**The biological significance of the tannins. Monthly and seasonal variations in the tannin content of the bark of the chestnut.**] Staz. Sper. Agr. Ital. 52: 305–331. 1919.—In order to decide upon the question as to whether the tannins are storage or secretory materials the author undertakes a study of the variation in tannin content of the bark of *Castanea* trees aged 2–5 and 20 years. The results are not readily summarized, but in general, the maximum content occurred at some time between early autumn and late winter, while in July—and usually as early as May—it was relatively low.—After a review of the chemical and physiological literature and a lengthy discussion the following conclusions are drawn. According to their origin, constitution, and physical and chemical properties the tannins should be considered in their main lines as glucosidal compounds, products of the etherification of an aromatic oxyacid and a sugar, generally glucose. The acids are of the fundamental types of gallic acid ($C_6H_2(OH)_3COOH$) and protocatechuic acid ($C_6H_3(OH)_2COOH$). The above-mentioned acids may be indirectly derived from quercitol and inositol. These conclusions regarding the derivation of the tannins and their glucosidal nature are upheld by their biogenetic, synthetic, and optical proper-

ties. Tannin is a strong protoplasmic poison since it strongly coagulates albumin. The author found that tannin would easily coagulate egg albumin when alone, but when acetic and tartaric acids were added, in small amounts in addition to tannin, coagulation did not take place. Citric acid was not quite as effective. Albumin coagulated by means of tannin would tend to return to its original sol condition after addition of acetic and tartaric acids. Tannin appears, and in fact accumulates, during the germination of some seeds in which it was not originally present. It can not, therefore, be considered as a reserve substance either for the sugar or the other substances it may contain; the latter would indeed be injurious if allowed to accumulate in the free state. The results of the investigation seem to justify the following interpretation as to the significance and behaviour of the tannins in the plant: The principal reason for the formation of these compounds is the property they have of being more easily oxidized than the phenolic acids from which they are derived, tannins being much more easily burned than gallic acid. This constitutes for the plant, deprived as it is of an excretory apparatus, a detail of the greatest importance, since it is a means of eliminating products that possess a high degree of toxicity. It is by this means that the tannins disappear by complete oxidation in fleshy fruits when their coagulating power is no more neutralized by the action of the organic acids which disappear during ripening. In other organs, instead, an equilibrium is established between the former or accumulated tannins and those which are destroyed by combustion. In peripheral organs such as the bark, directly exposed to the action of atmospheric oxygen and to the influence of fluctuating external factors, the equilibrium is subject to many fluctuations, especially is oxidation intensified with increase of temperature, reaching a maximum during the warmest summer months. Tannins as glucosides are then to be considered as refuse materials which the plant easily destroys, utilizing the process of combustion, thereby initiated, for "vital" purposes.—*A. Bonazzi.*

838. Gerhardt, Karl. **Die Exkretion und ihre Bedeutung im Leben der Pflanze. [Excretion and its importance in plant life.]** Naturwissenschaften 8: 7-8. 1920.—The work of Benecke, Amar, and especially Stahl, has shown that the oxalic acid formed in respiration and possibly in assimilation, neutralizes the surplus (harmful) calcium in the plant. This explanation of the rôle of oxalic acid has contributed much to a new understanding of the exudation of water by the plant. This explanation of guttation, as developed mainly by Stahl, is discussed at length.—*Orton L. Clark.*

839. Gola, G. **Sulla presenza, nella piante, di composti ematoidi di ferro. [The presence of haematin in plants.]** Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e Nat.) 28^2: 146–150. 1919.—From organic plant material, notably the leaves of *Lemna* and other water plants, when extracted with boiling dilute HCl, a solution is obtained which shows positive peroxidase properties. This solution was free from iron. If on the other hand you repeat the extraction with ammonia, thereby getting the iron in solution, you obtain a residue which reacts positively, although the iron has been extracted. This seems to indicate that in plants Bach's theory, that the enzymatic peroxidase reaction is not dependent on iron, holds true; and further, that the reaction is comparable to that obtained in animal chemistry, namely, that the peroxidase property of the blood is not due to a combination of the iron with the organic molecule. In this connection it is of interest to note that as regards distribution of the enzyme in plants, most of it is found in the peripheral parts of the plant, in the tissues of the phloem and the medullary rays, and that it is scarce in green tissues.—*E. F. Artschwager.*

840. Greig-Smith, R. **Contributions to our knowledge of soil-fertility. XVI. The search for toxin-producers.** Proc. Linnean Soc. New South Wales 43: 142-190. 1918.—See Bot. Absts. 5, Entry 2281.

841. Itano, Arao, James Neill, and Mary E. Garvey. **Limiting and optimum reactions for growth of B. botulinus and organisms isolated from food.** [Abstract.] Absts. Bact. 4: 3. 1920.

842. Masoni, G. **Saggi sui succhi radicali. Prima nota. [Tests on root saps. First contribution.]** Staz. Sper. Agr. Ital. 52: 569–583. 1919.—The present investigation was undertaken by the author in connection with the question of chlorosis of plants due to excess of calcium in the soil, and it covers only one phase of the question as it relates to the behaviour of the root sap to various solutions rather than the root excretions. Experiments were made with *Cichorium*, *Zea*, *Lupinus* and *Daucus* by crushing the roots and extracting them with cold water and using the filtered solution. Solutions of ferric chloride 1–2 per cent were added in the presence or absence of an alkaline solution of ammonia, or lime water. In other cases ferric citrate, citric acid, nitric acid, acetic acid, dipotassium citrate, sodium acetate, glucose, and saccharose were used together with the ferric solution. The results of the investigation are thus summarized: Under equal conditions juices of various plants act differently towards the ferric solutions, some causing a complete precipitation of the iron—although the solution be acid—others leaving the iron in solution. The presence of ferric citrate, citric acid, or dipotassium citrate avoids the precipitation of the iron. This action is not exerted by equivalent amounts of acetic acid, sodium acetate, or nitric acid. Sugars have only a negligible action in preventing the iron from becoming insoluble, and in concentrations of as much as 40 per cent of saccharose the action was very slight. The juice of *Daucus* was the most active in maintaining the iron in solution, while the juice of *Lupinus* and *Zea* follow in the order given. In the latter plant the sap of the stalk at flowering time gave the same reaction as the root sap. The author excludes the possibility that the insolubility may be due to the action of tannic substances, and is more inclined to believe that the phenomenon is due to the combined action of colloids, proteins, and possibly also to the phosphates to be found in the juices. The method is, according to the author, applicable to the study of the fate of ferric substances after their entrance into the plant rather than to their preparation for absorption by the plant. The principal consideration in these investigations is the assumption of two sets of substances active in this connection: the one—probably made up of proteins—capable of rendering the iron insoluble, and the other capable both of counteracting this first one and of dissolving the precipitate after it has been formed. Therefore the circulation of mineral iron in the plant is dependent upon these two groups of substances, and this condition may have an important bearing upon the adaptation of plants to various media.—*A. Bonazzi.*

843. Olitsky, Peter K., and I. J. Kligler. **Toxins and antitoxins of B. dysenteriae Shiga.** [Abstract.] Absts. Bact. 4: 18. 1920.

844. Teodoresco, Em. C. **Sur la présence d'une phycoérythrine dans le Nostoc commune. [On the presence of a phycoerythrin in Nostoc commune.]** Rev. Gén. Bot. 32: 145–160. *2 pl. 4 fig.* 1920.—*Nostoc commune* varies widely in color. The author found material giving red pigment, but no blue pigment, in solution when macerated. Both pigments (phycoerythrin and phycocyanin) are usually present in varying proportions. Solutions of many shades of color ranging from red through blue to violet were also obtained from other material. From all of them a red pigment was isolated by differential capillary absorption by filter paper. The red aqueous solution obtained when red zones of filter paper were placed in water had a yellow-orange fluorescence like that of phycoerythrin. Its spectrum showed the same 3 absorption bands with the same relative intensities as are seen in phycoerythrin from *Ceramium rubrum* and other red algae (Kylin and other authors) as well as in the red pigment from *Oscillatoria Cortiana* (Bocat). Its reaction to acids, alkalies, and other reagents are essentially the same as those of phycoerythrin from red algae. Solutions of the red pigment to which antiseptics had been added, and which were kept in the dark, remained unchanged for 2 years. When such precautions were not taken decomposition occurred. During the first stages of this decomposition the relative intensity of the 3 absorption bands is reversed, precisely as in the case of phycoerythrin from *Ceramium* and also the red pigment from *Oscillatoria* (Gaidukow).—The author concludes that the red pigment in *Nostoc commune* and other Cyanophyceae is the same as that in the Florideae, and not merely a variety of phycocyanin to which it is closely related, but from which it differs decidedly in its spectrum. Phycoery-

hrin in Cyanophyceae probably arises by transformation of phycocyanin, since the two pigments vary in the plant in inverse ratio. The red pigment of certain Myxophyceae (Sauvageau) is regarded as phycoerythrin by the author.—*L. W. Sharp.*

METABOLISM (NITROGEN RELATIONS)

845. Blish, M. J. **Effect of premature freezing on composition of wheat.** Jour. Agric. Res. 19: 181–188. 1920.—This is an investigation of the effect of premature freezing on the more important chemical constituents of the wheat (*Triticum*) kernel, with special reference to the nitrogen compounds, from which gluten is formed. Frozen wheat contains larger amounts of nonprotein nitrogen, reducing sugars, and acid-reacting substances than does sound wheat. The nonprotein nitrogen of frozen wheat carries a considerably higher percentage of a-amino nitrogen than that of sound wheat.—*D. Reddick.*

846. Cauda, A. **Gruppi vegetali fissatori di azoto libero.** [Plant groups that fix free nitrogen.] Nuovo Gior. Bot. Ital. 26: 169–178. 1919.—*Bacillus Cruciferae*, isolated from the roots of various cruciferous plants (*Raphanus*, *Sinapus*, *Brassica*) was found to fix free nitrogen, especially when cultivated on liquid media having an excess of calcium carbonate and a deficiency of nitrogen. The amount of nitrogen fixed by the organism nearly equals that obtained from *Azotobacter* and surpasses *Bacillus radicicola*. *Bacillus Cruciferae* forms round, whitish colonies of viscid consistency. Older colonies turn yellow, rose, or red brown. The organism is rod shaped and forms chains; it is stained yellow with potassium iodide and blue with Löffler's stain and methylene blue.—*Ernst Artschwager.*

847. Davis, Lewis, and Newell S. Ferry. **Studies on diphtheria toxin. II. The rôle of the amino acids in the metabolism of Bacterium diphtheriae.** [Abstract.] Absts. Bact. 3: 9–10. 1919.

848. Sani, Giovanni. **Intorno all'attività riduttrice delle radici delle graminaceae: la riduzione del nitrato di calcio per le radici delle graminacee.** [Reduction of calcium nitrate by roots of the Graminaceae.] Atti R. Accad. Lincei Roma Rend. (Cl. Fis. Mat. e Nat.) 28^2: 199–201. 1919.—The theories regarding the reduction of nitrates in plants are reviewed as an introduction to a series of articles on this subject. [See also next following Entry, 849.] —*F. M. Blodgett.*

849. Sani, Giovanni. **Intorno alla attività ridduttrice della radici delle graminacee: la riduzione del nitrato di calcio per le radici graminacee. Nota II.** [The reduction of calcium nitrate by roots of the Graminaceae.] Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e Nat.) 28^2: 244–247. 1919.—The extracts of the roots of wheat, oats, barley, and corn were found to contain a reducing substance when tested either as an aqueous extract or after purifying. It was also found that extracts made from the roots of maize and wheat reduced calcium nitrate solution. This reducing action came to a stop after a certain concentration was reached and was inhibited entirely by an alkaline solution of Rochelle salt. [See also next preceding Entry, 848.]—*F. M. Blodgett.*

METABOLISM (ENZYMES, FERMENTATION)

850. Cauda, A. **Prove di fermentazione vinosa con aggiunta di lieviti purificati.** [Investigations upon alcholic fermentation with purified yeasts.] Staz. Sper. Agr. Ital. 52: 524–533. 1919.

851. Chesnut, V. K. **Report on papain.** Jour. Assoc. Official Agric. Chem. 3: 387–397. 1920.—A study of *Papaya* latex, especially its enzyme action.—*F. M. Schertz.*

852. Clark, Mansfield. **The production and activity of proteus gelatinase in relation to P_H.** [Abstract.] Absts. Bact. 4: 2. 1920.

853. Dox, Arthur W., and Lester Yoder. **Influence of fermentation on the starch content of experimental silage.** Jour. Agric. Res. 19: 173–179. 1920.—Starch constitutes about 10 per cent of maize at the time of ensiling. Studies of silage at different stages in the fermentation process show that changes in acidity, alcohol, and sugar are entirely independent of the starch content of the ensiled maize, and that the starch content remains constant throughout the process. The granules remain intact, undergoing no detectable physical change.—*D. Reddick.*

854. Effront, Jean. **Sur la relation entre l'acroissement des cellules et la production des enzymes. [Relation between cell growth and enzyme production.]** Compt. Rend. Soc. Biol. Paris 83: 194–195. 1920.—Experimenting with "top-yeast" in solutions of increasing degrees of alkalinity the author finds that fermentation of the sugar, that is, enzyme production, occurs at a degree of alkalinity considerably beyond that at which growth or production of new cells takes place.—*E. A. Bessey.*

855. Maestrini, D. **Contributo alla conoscenza degli enzimi. I: Amilasi dell'orzo germogliato. [Amylase of germinating barley.]** Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e Nat.) 28^2: 393–394. 1919.—While amylase of germinating barley may be extracted with distilled water it is more active when this is acidified with acetic acid, and the extraction should have a duration of 6 hours. The soluble starch of commerce is strongly split up by this extract even in neutral solution; the other starches are not split if not first reduced to a paste and if not in solutions of a certain acidity. The source of starch does not perceptibly affect the amylolytic activity. Hydrochloric and acetic acid hasten the action in nearly the same manner. Potassium hydroxide acting for ten hours paralyses the amylolytic activity. The invert sugar produced is a maximum at about 45°C., at 50° the amount of invert sugar diminishes, and it is zero at 70°.—*F. M. Blodgett.*

856. Simon, René. **Contribution à l'étude de la digestion des tissus végétaux. [The digestion of plant tissue.]** Actes Soc. Linneenne Bordeaux (Proces-verbaux) 68: 87–98. 1914. [Received May, 1920].—The progress of pectose digestion was observed by appropriate means in thin sections of roots, leaves, and germinating seeds. After the alteration of the pectose of the middle lamella the cell walls tend to dissociate. The initial stages of digestion and the subsequent transformations of pectose are made visible by first treating thin sections of plant tissue in a dilute acid (1–2 per cent HCl) for 5 minutes. The acid hydrolizes the pectose in all parts of the plant tissue, but the progress of digestion will be more advanced in those parts in which digestion had started before the initial treatment. The plant tissue is next immersed in a saturated aqueous solution of ammonium oxalate or an alkaline salt, and finally, after washing in water, is stained with Ruthenium red. Pectose which remains unmodified will be soluble in water or alkaline solutions and will not be stained. Pectose-pectin, one of the products of digestion, will be insoluble in water and easily colored by basic dyes.—*W. H. Emig.*

METABOLISM (RESPIRATION)

857. Molliard, M. **Influence de la réaction du milieu sur la respiration du Sterigmatocystis nigra. [Influence of the reaction of the culture medium upon the respiration of Sterigmatocystis nigra.]** Compt. Rend. Soc. Biol. Paris 83: 50–51. 1920.—When grown in saccharose solution of varying degrees of acidity (H_2SO_4) or alkalinity (Na_2CO_3) the production of oxalic acid does not appear at an acidity beyond N /50 and steadily increases with the alkalinity to a maximum at 3N /50. Beyond N /12.5 no acid is formed. Allowing for the CO_2 disengaged from the Na_2CO_3 by the oxalic acid the amount of this gas set free by respiratory processes increases rapidly as the acidity diminishes from N /10 reaching a maximum at N /50 alkalinity and diminishing slowly to 3N /50 and very rapidly thence to N /12.5. The absorption of oxygen parallels this exactly, the respiratory quotient averaging about 0.90.—*E. A. Bessey.*

ORGANISM AS A WHOLE

858. Meader, P. D., and G. H. Robinson. **Some physical and biological properties of the streptococcus hemotoxin.** [Abstract.] Absts. Bact. 4: 17. 1920.

859. Pringsheim, Hans. **Symbiose bei Bakteria.** [Symbiosis of bacteria.] Naturwissenschaften 8: 101–103. 1920.

860. W[inslow], C.-E. A. **The lactic acid bacteria.** [Rev. of: Orla-Jensen, S. **The lactic acid bacteria.** Mem. Acad. R. Sci. et Let. Danemark (Sect. Sci.) VIII, 5: 81–196. *51 pl.* 1919.] Absts. Bact. 4: 102. 1920.—See Bot. Absts. 6, Entry 183.

GROWTH, DEVELOPMENT, REPRODUCTION

861. Coupin, H. **Sur les causes de l'élongation de la tige des plantes étiolées.** [The causes of stem elongation in etiolated plants.] Compt. Rend. Acad. Sci. Paris 170: 189–191. 1920.—In a study of etiolation in seedlings of white lupine it is found that the rate and the total amount of elongation of the hypocotyls and the roots of plants growing in the dark may be prevented from materially exceeding that of seedlings grown in light, if there is added to the media in which the seedlings are grown a quantity of the expressed sap of seedlings grown in light. It is therefore concluded that chloroplasts in the presence of light produce a substance which though not entirely toxic has a retarding effect upon the rate of growth. Thus the expressed sap of green seedlings reduces the rate of growth of plants growing in darkness, whereas in plants grown in darkness in water or in a solution containing the expressed sap of etiolated plants the ordinary rapid elongation characteristic of etiolation takes place.—*C. H. & W. K. Farr.*

862. Marshall, Max Skidmore. **Association of Bacillus subtilis and Streptococcus lacticus.** [Abstract.] Absts. Bact. 4: 5. 1920.

863. Mitscherlich, E. A. **Das Liebigsche Gesetz vom Minimum und das Wirkungsgesetz der Wachstumfactoren.** [Liebig's Law of the Minimum and the "effect rule" of growth factors.] Naturwissenschaften 8: 85–88. 1920.—Mitscherlich doubts the truth of Liebig's Law, and he asks and attempts to answer the following questions: (1) Does the amount of plant production depend on only one vegetation factor, the so-called minimum factor? (2) According to what proportionality may this be true? He then formulates and illustrates with curves the law of physiological relation, or better, the effect law of growth factors, and points out that there can be no such thing as one minimum factor alone determining the amount of plant production, but that all growth factors together have a very definite influence on production.—*Orton L. Clark.*

864. Molliard, M. **Tuberisation asèptique de la carotte et du dahlia.** [Tuber formation of carrot and dahlia under aseptic conditions.] Compt. Rend. Soc. Biol. Paris 83: 138–140. 1920.—When grown free from bacteria or fungi carrots and dahlias formed their normal roots or tubers, respectively, showing that the presence of a symbiotic fungus is not necessary for this process.—*E. A. Bessey.*

865. Popoff, Methodi. **Artificial parthenogenesis and cell stimulants.** Sci. Amer. Monthly 1: 312-316. *1 fig.* 1920. [Translated from Biol. Centralbl. (Leipzig), April 20, 1916.]

866. Urbain, A. **Influence des matières de réserve de l'albumen de la graine sur le developpement de l'embryon.** [Influence of the reserve materials of the endosperm upon the development of the embryo.] Rev. Gén. Bot. 32: 125–139, 165–191. *24 fig.* 1920.—The author reports notable success in rearing embryos which have been separated from their endosperms. Several species were used, including wheat, oats, barley, *Mirabilis jalapa, Daucus carota, Nigella hispanica, Spinacea oleracea* and *Pinus pinea.*—Experiments on wheat, oats, and

barley were conducted as follows: Grains were soaked in water; after 3 hours 5 embryos were isolated and placed on blotting paper wet with nutrient solution (lot P_1); one day later 5 more were similarly treated (lot P_2) the next day 5 more were similarly treated (lot P_3). In P_2 the growth of the embryo had begun; in P_3 and in checks (embryos not separated from endosperm) the plumule had become green, but the endosperm had decreased only slightly in weight. On the third day measurements and weighings showed that the plumule and first adventitious root were nearly twice as long in P_3 and P_1, and that P_2 had gained from $2\frac{1}{2}$ (barley) to $6\frac{1}{2}$ (wheat) times as much weight as had P_1. On the seventh and twentieth days all lots were growing, but checks and P_3 were much better developed than P_1 and P_1. From this and several other experiments it is concluded that in no case is endosperm indispensable to the development of the plantlet; all species treated can grow in nutrient solution. The removal of the endosperm retards the life processes of the embryo; its presence favors the development of the plantlet during the first few days and results in marked changes later. However, since the amount of endosperm material consumed by the third day is so slight this effect must be due to some stimulus exciting enzymatic activity and the use of reserve materials within the embryo itself.—Plants of all lots were raised to maturity in soil. Although plants of lot P_1 were often nearly as well developed as the checks, those of lots P_1 and P_2 showed more pronounced modifications: roots less branched; stems simpler; leaves smaller, less numerous and simpler in form; inflorescence precocious, less well developed and showing various abnormalities; fruits often aborted; all parts dwarfed.—A comparison of sections of P_1 plants and the checks in *Ricinus*, *Nigella*, *Papaver*, *Solanum*, *Torilis*, and *Zea*, showed the internal structure to be much simpler in the plant which had been deprived of their endosperm. In the stem the cells are fewer and smaller; the cortex shows fewer layers; the tissues of the central cylinder are less differentiated, the vascular bundles being fewer and with fewer elements; the pith is relatively large. Similar modifications are present in root and petiole. In the leaf the epidermis appears nearly normal, but the other tissues show reduction in the number and size of their elements. The greater the dwarfing the more pronounced are these modifications. —*L. W. Sharp.*

REGENERATION

867. Loeb, J. **Quantitative laws in regeneration. I.** Jour. Gen. Physiol. 2: 297–307. 1920.—Dry weight measurements show that, when a piece of stem of *Bryophyllum calycinum* inhibits the production of shoots and roots in an attached leaf, the stem gains in weight and this gain approximately equals the mass of shoots and roots that the leaf would have produced if it had been detached from the stem. "This suggests that the inhibitory influence of the stem upon the formation of shoots and roots in the leaf is due to the fact that the material available for the process naturally flows into the stem."—*Otis F. Curtis.*

868. Okada, Yoonosuke. **Studien über der Proliferation der Markholenzellen im Stengel der Vicia faba. [Studies on the proliferation of pith cells in the stem of Vicia faba.]** Bot. Mag. Tokyo 34: 19–34. *4 photog., 7 fig.* 1920.—This paper gives a brief review of the literature and describes the author's methods and results. The hollow stems were injected by means of a glass hypodermic syringe with distilled water and various dilute salt solutions, sugar, glycerine, alcohol, and ammonia in different concentrations and at different temperatures. Temperature had little effect and dilute solutions differed little or not at all from water. More concentrated solutions failed uniformly to produce any proliferation. The author concludes that water absorption and increased turgor are the chief causes of the hypertrophy and the division of the pith cells. From one to seven injections were made in each stem, resulting in intumescences in the majority of cases. The entire cavity was sometimes filled. Acids and a substance turning orange red with H_2O_2 accumulated in the affected cells.—*Leonas L. Burlingame.*

TEMPERATURE RELATIONS

869. Bigelow, W. D., and J. R. Esty. **The thermal death point in relation to time of some resistant organisms.** [Abstract.] Absts. Bact. 4: 10. 1920.

870. Gain, Edmond, and André Gain. **Conditions thermiques du sol sous l'influence de la végétation locale.** [Thermal conditions of the soil under the influence of local vegetation.] Rev. Gén. Bot. 32: 161–164. 1920.—See Bot. Absts. 6, Entry 299.

RADIANT ENERGY RELATIONS

871. Denis, Marcél. **L'optimum lumineux pour la developpement du Stichococcus bacillaris Nag.** [Optimum light for Stichococcus bacillaris Nag.] Rev. Gén. Bot. 32: 72–77. 1920. —Pure culture of *Stichococcus bacillaris* produced the greatest dry weight of growth in Detmers' nutrient solution when exposed to rather weak illumination. In direct sunlight the cells were yellow-green and more or less spherical. In tap water initial development was possible in all light-intensities tried, but continued growth was prevented by the inability to fix free nitrogen.—*F. B. Wann.*

872. Eberson, Frederick. **Ultraviolet rays and their effect on antigenic properties. I. Ultraviolet light and meningococci.** [Abstract.] Absts. Bact. 4: 21–22. 1920.

MISCELLANEOUS

873. Cheplin, Harry A., and Leo F. Rettger. **Studies on the transformation of the intestinal flora.** [Abstract.] Absts. Bact. 4: 8. 1920.

874. Clark, Mansfield. **Reduction potential in its relation to bacteriology.** [Abstract.] Absts. Bact. 4: 2. 1920.

875. Koketsu, Riichiro. **Time records for physiology, ecology, and climatology.** Bot. Mag. Tokyo 34: 13–14. 1920.—Since physiological processes are related to actual solar time, the author suggests that records expressed in the ordinary standard time are not properly comparable. He suggests their translation into solar time for publication, the more particularly so that many countries have now adopted the custom of changing their clocks in conformity with the so-called daylight-saving laws.—*Leonas L. Burlingame.*

876. Kopeloff, Nicholas, and Lillian Kopeloff. **Biological factors in sugar-deterioration.** [Abstract.] Absts. Bact. 4: 7. 1920.

877. Rogers, L. A., and C. L. McArthur. **Variation in the colon count in Potomac river water.** [Abstract.] Absts. Bact. 3: 1. 1919.

878. Rogers, L. A. **An improved apparatus for drying cultures by the freezing method.** [Abstract.] Absts. Bact. 3: 6. 1919.